Mystery science

Units & Storylines Overview



A Glimpse into Our Curriculum

Mystery Science is a hands-on curriculum that is fully standards-aligned.

Mystery Science's units of study contain:

- Hands-on activities with every lesson
- Real-world investigative phenomena
- Thoughtful discussions to build background knowledge
- Lesson & unit assessments to evaluate comprehension
- Curated, cross-curricular extensions

Other tools:

Standards Alignment Guides
Pacing Guides
Anchor Layer Teacher Guides

About Mystery Science Units

Each of our standards-aligned lessons begin with real-life phenomena, have in-depth discussion questions, and feature hands-on activities. There are curated extensions, vocabulary resources, and more offered with every lesson. With the Anchor Layer off, teachers can choose to teach our science unit lessons in any order they need or in isolation.

Science Units

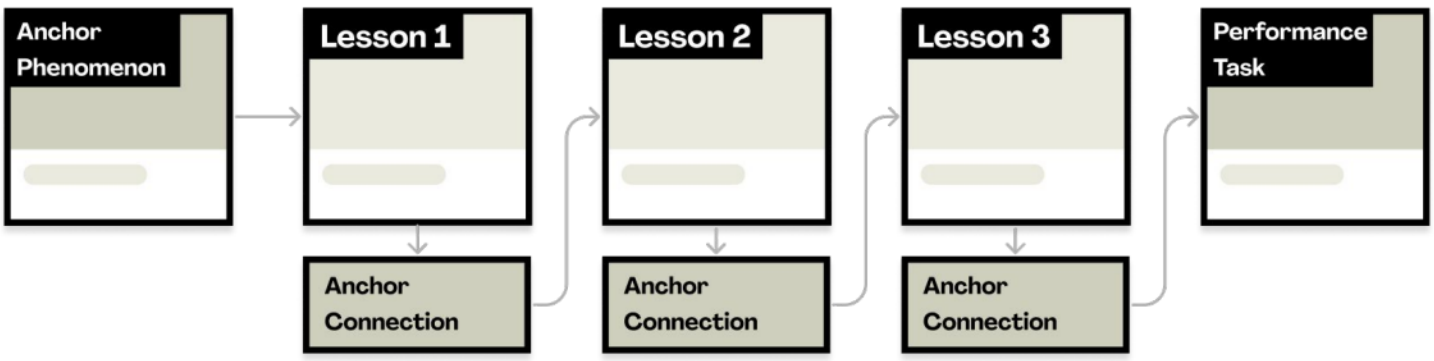


The Anchor Layer

The Anchor Layer is for teachers who are prepared to teach units in their entirety, as it builds ideas off of the concepts presented in each lesson within the unit. Turning on the Anchor Layer adds:

- A unit-level anchor phenomenon before the first lesson,
- A connection at the end of every lesson where students apply what they've learned to the anchor phenomenon, and
- A performance task where students apply what they learned to a new project.

Science Units with Anchor Layer ON



Kindergarten

Life Science **Page 4**
- Animal Needs
- Plant Needs

Earth & Space Science **Page 6**
- Severe Weather
- Weather Patterns

Physical Science **Page 8**
- Sunlight & Warmth
- Pushes & Pulls

1st Grade

Life Science **Page 11**
- Animal Traits & Survival
- Plant Traits & Survival

Earth & Space Science **Page 13**
- Day Patterns
- Night Patterns

Physical Science **Page 15**
- Light, Sound, & Communication

2nd Grade

Life Science **Page 16**
- Animal Biodiversity
- Plant Adaptations

Earth & Space Science **Page 18**
- Erosion & Earth's Surface

Physical Science **Page 20**
- Material Properties

3rd Grade

Life Science **Page 22**
- Fossils & Changing Environments
- Life Cycles
- Heredity, Survival, & Selection

Earth & Space Science **Page 27**
- Weather & Climate

Physical Science **Page 29**
- Forces, Motion, & Magnets

4th Grade

Life Science **Page 31**
- Human Body, Vision, & The Brain
- Animal & Plant Adaptations

Earth & Space Science **Page 33**
- Earth's Features & Processes

Physical Science **Page 35**
- Sound, Waves, & Communication
- Energy & Energy Transfer
- Electricity, Light, & Heat

5th Grade

Life Science **Page 38**
- Ecosystems & The Food Web

Earth & Space Science **Page 40**
- Water Cycle & Earth's Systems
- Earth & Space Patterns
- Stars & Planets

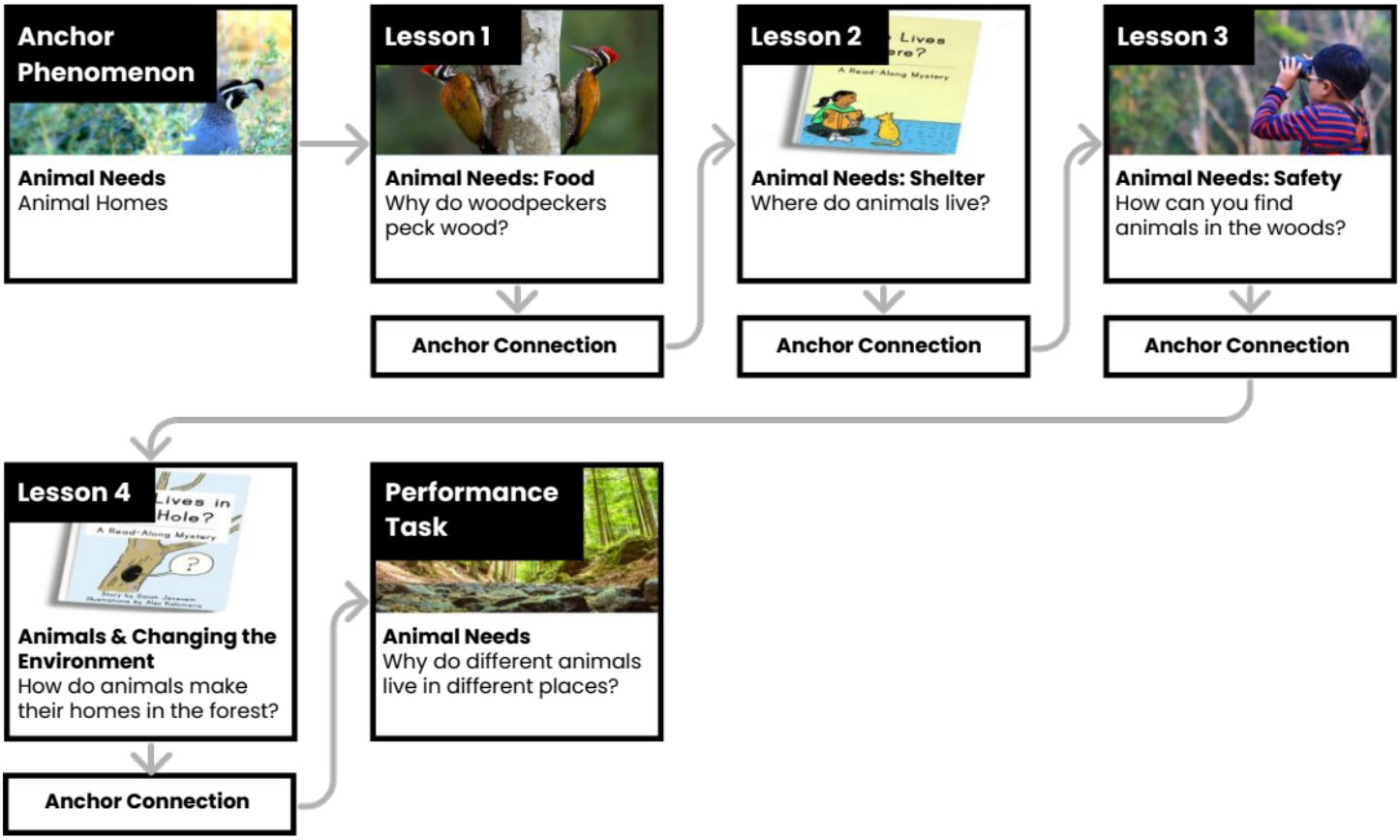
Physical Science **Page 44**
- Chemical Reactions

Animal Needs • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students use observations to understand the basic needs of animals. Students explore how animals need things to eat and a safe place to live, and also how animals can change their environments to meet those needs.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive. • K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. • K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs	• Analyzing and Interpreting Data • Developing and Using Models • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• LS1.C. Organization for Matter and Energy Flow in Organisms • ESS3.A. Natural Resources • ESS2.E. Biogeology	• Systems and System Models • Patterns

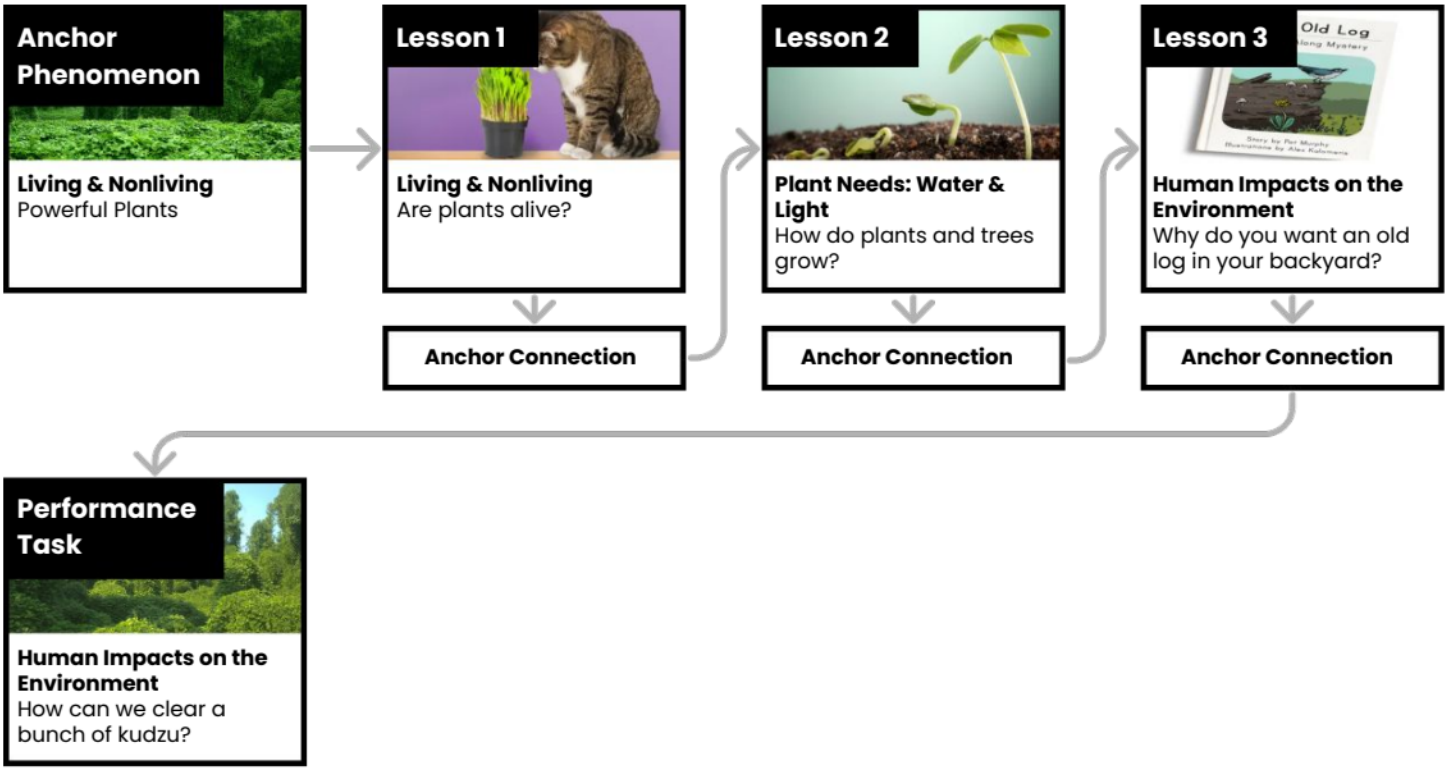


Plant Needs • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students use observations to understand the basic needs of plants, such as water and sunlight. They also observe young plants and the changes they undergo as they grow from seed to seedling.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive. • K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	• Analyzing and Interpreting Data • Planning and Carrying Out Investigations • Obtaining, Evaluating, and Communicating Information	• LS1.C. Organization for Matter and Energy Flow in Organisms • ESS3.C: Human Impacts on Earth Systems	• Cause and Effect • Patterns



Severe Weather • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore storms and severe weather! They obtain information from weather forecasts to prepare for storms and stay safe. They also practice describing the various characteristics of weather (wind, clouds, temperature, and precipitation) in order to make their own predictions about storms.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. • K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	• Obtaining, Evaluating, and Communicating Information • Asking Questions and Defining Problems • Analyzing and Interpreting Data	• ESS3.B: Natural Hazards • ESS2.D: Weather and Climate	• Cause and Effect • Patterns

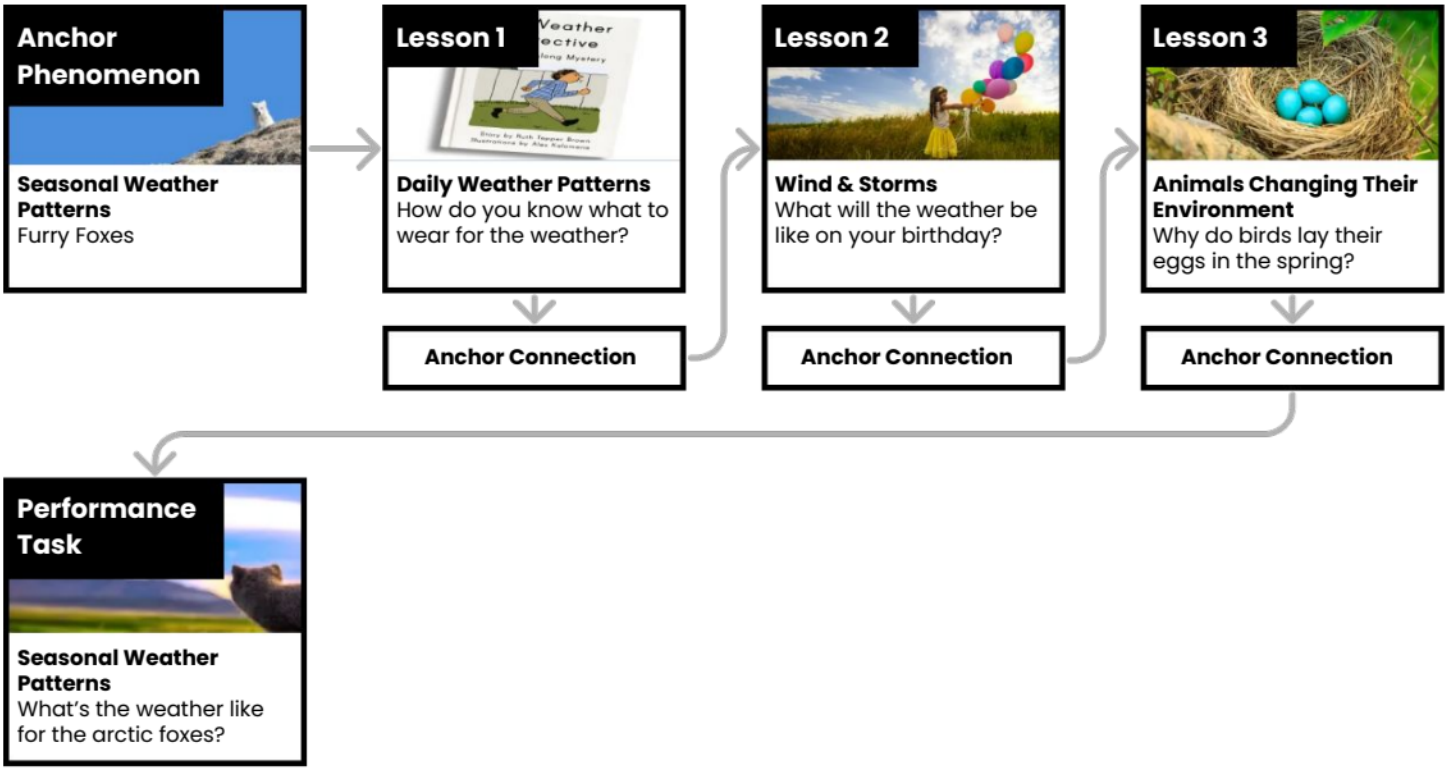


Weather Patterns • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students gather evidence in order to identify daily and seasonal weather patterns. They use those patterns to explain mysteries like why you might lose your jacket during the day or why birds lay their eggs at certain times of the year.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. • K-ESS2-2. Construct an argument supported by evidence for how plants & animals (including humans) can change the environment to meet their needs.	• Obtaining, Evaluating, and Communicating Information • Asking Questions and Defining Problems • Analyzing and Interpreting Data • Engaging in Argument from Evidence • Developing and Using Models	• ESS2.E: Biogeology • ESS2.D: Weather and Climate	• Systems and System Models • Patterns • Structure and Function

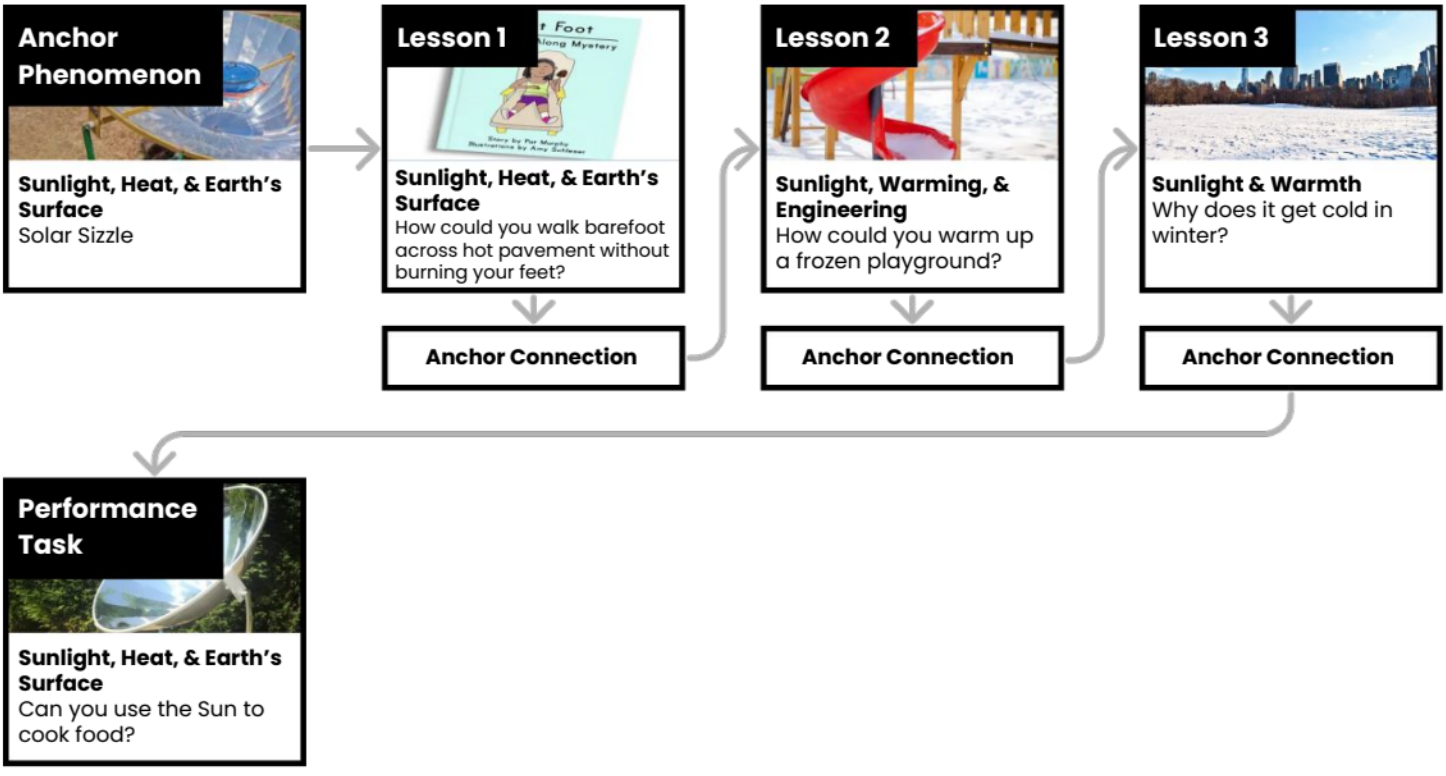


Sunlight & Warmth • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students make observations to explore how sunlight warms the Earth's surface. The Sun's energy heats up the pavement, keeps us warm, and can even melt marshmallows. Using what they learn, students think about ways that shade and structures can reduce the warming effect of the Sun.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. • K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. • K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	• Analyzing and Interpreting Data • Developing and Using Models • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• LS1.C. Organization for Matter and Energy Flow in Organisms • ESS3.A. Natural Resources • ESS2.E. Biogeology	• Systems and System Models • Patterns



Pushes & Pulls • Unit Summary (pg 1 of 2)

See Anchor Layer Teacher Guide

In this unit, students are introduced to pushes and pulls and how those affect the motion of objects. Students observe and investigate the effects of what happens when the strength or direction of those pushes and pulls are changed.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• K-PS2-1. Plan & conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. • K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. • K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. • K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	• Analyzing and Interpreting Data • Developing and Using Models • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• LS1.C. Organization for Matter and Energy Flow in Organisms • ESS3.A. Natural Resources • ESS2.E. Biogeology	• Systems and System Models • Patterns

Unit Lesson Flow on Next Page

Pushes & Pulls • Lesson Flow (pg 2 of 2)

Anchor Phenomenon



Pushes & Pulls
Big Barges

Lesson 1



Pushes & Pulls
What's the biggest excavator?

Anchor Connection

Lesson 2



Pushes, Pulls, & "Work Words"
Why do builders need so many big machines?

Anchor Connection

Lesson 3



Motion, Speed, & Strength
How can you knock down a heavy wall?

Anchor Connection

Lesson 4



Speed & Direction of Force
How can you knock down the most pins?

Anchor Connection

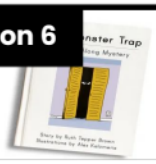
Lesson 5



Direction of Motion & Engineering
How can we protect a mountain from falling rocks?

Anchor Connection

Lesson 6



Forces & Engineering
How could you invent a trap?

Anchor Connection

Performance Task



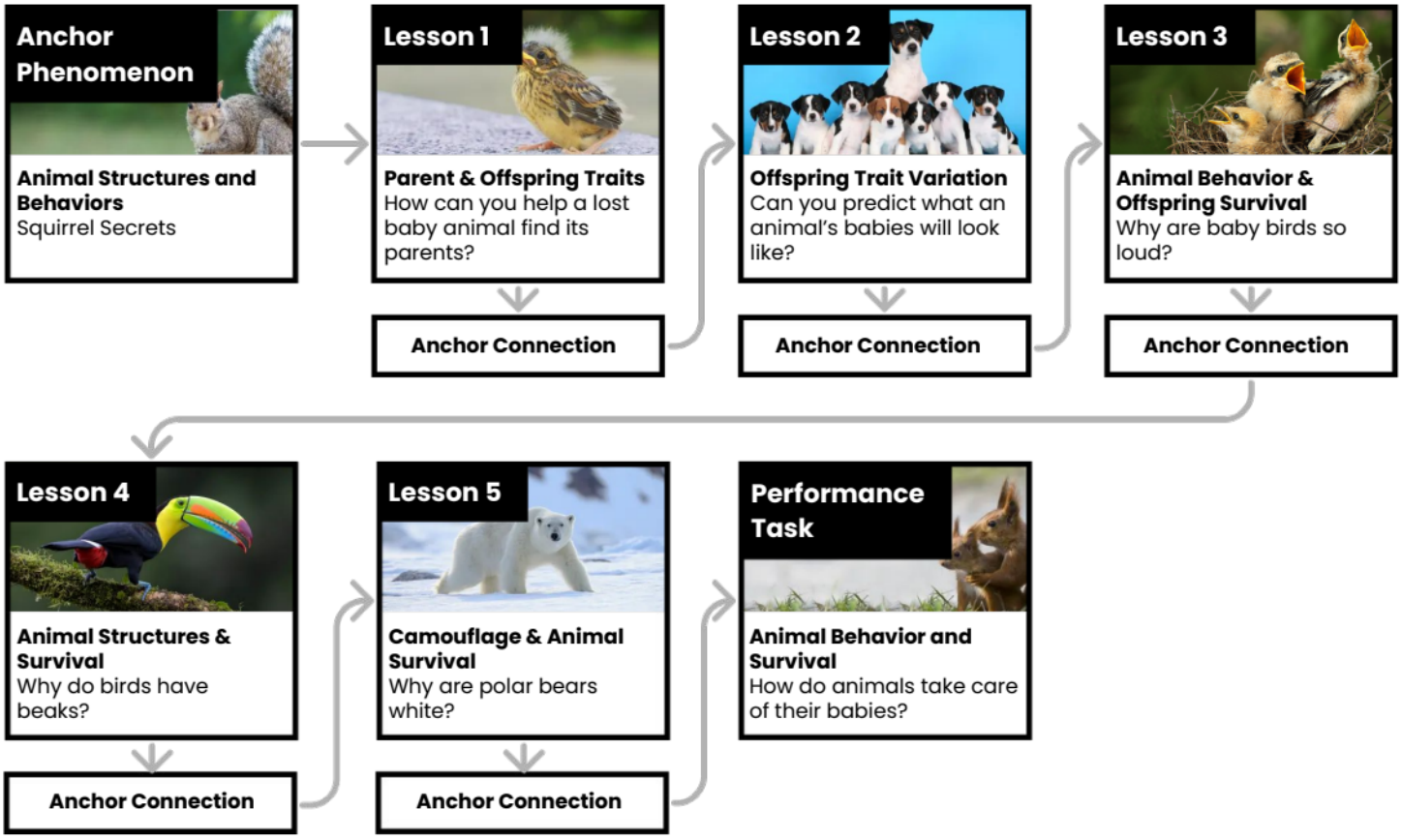
Pushes & Pulls
What do tugboats do?

Animal Traits & Survival • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore the traits of adult and baby animals! Students make observations of parent animals and their offspring, determining how they are similar and different. They explore certain behaviors that help offspring survive. Students also investigate how the traits of animals are essential for their growth and survival.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. • 1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. • 1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.	• Constructing Explanations and Designing Solutions • Developing and Using Models • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Obtaining, Evaluating, and Communicating Information • Engaging in Argument from Evidence	• LS3.A: Inheritance of Traits • LS3.B: Variation of Traits • LS1.A: Structure and Function • LS1.B: Growth and Development of Organisms	• Structure and function • Patterns

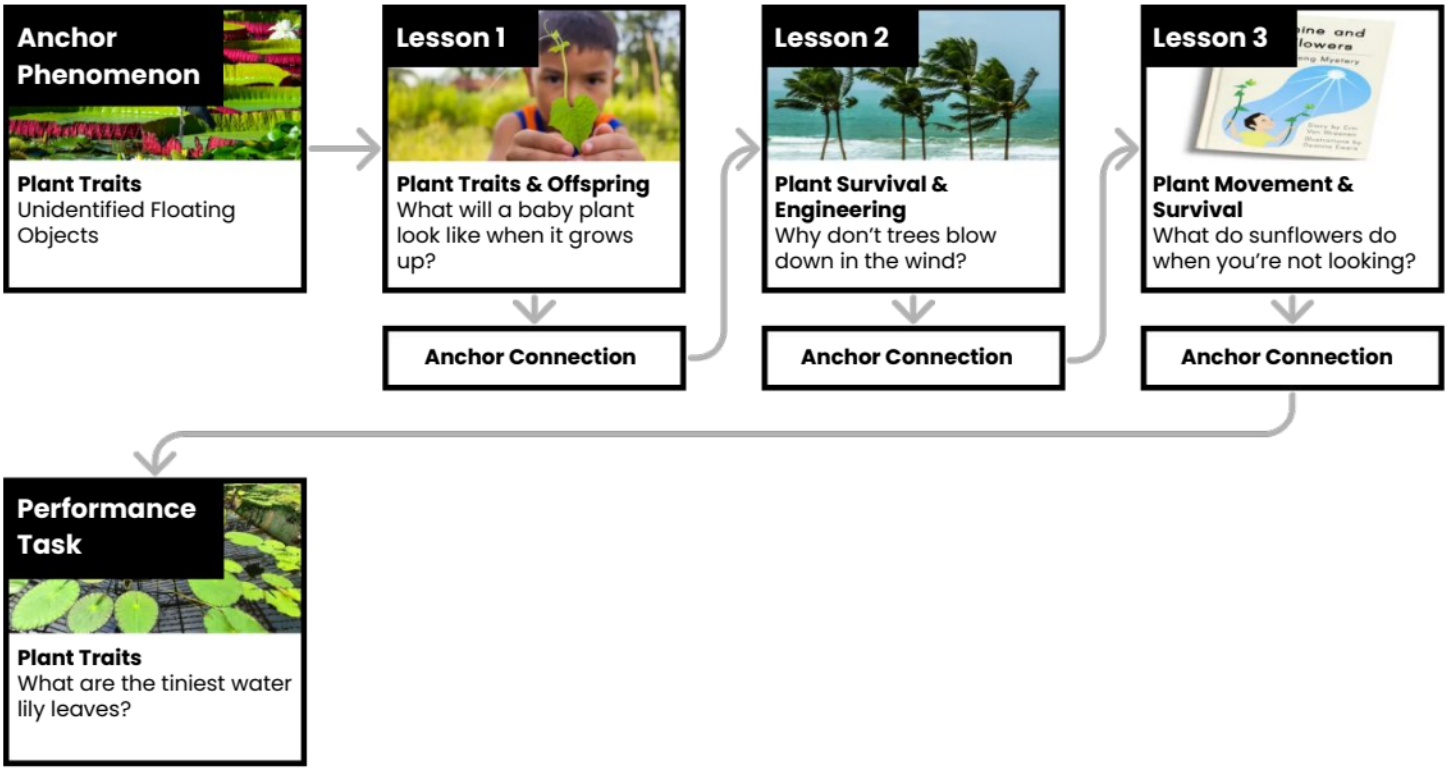


Plant Traits & Survival • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore the different parts of plants, like roots, stems, branches, leaves, flowers, and fruits. They observe similarities and differences between parent plants and their offspring. Students also investigate how plant traits help those plants survive.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. • 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. • K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. • K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	• Constructing Explanations and Designing Solutions • Developing and Using Models • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Obtaining, Evaluating, and Communicating Information • Engaging in Argument from Evidence	• LS3.A: Inheritance of Traits • LS3.B: Variation of Traits • LS1.A: Structure and Function • LS1.B: Growth and Development of Organisms	• Structure and function • Patterns

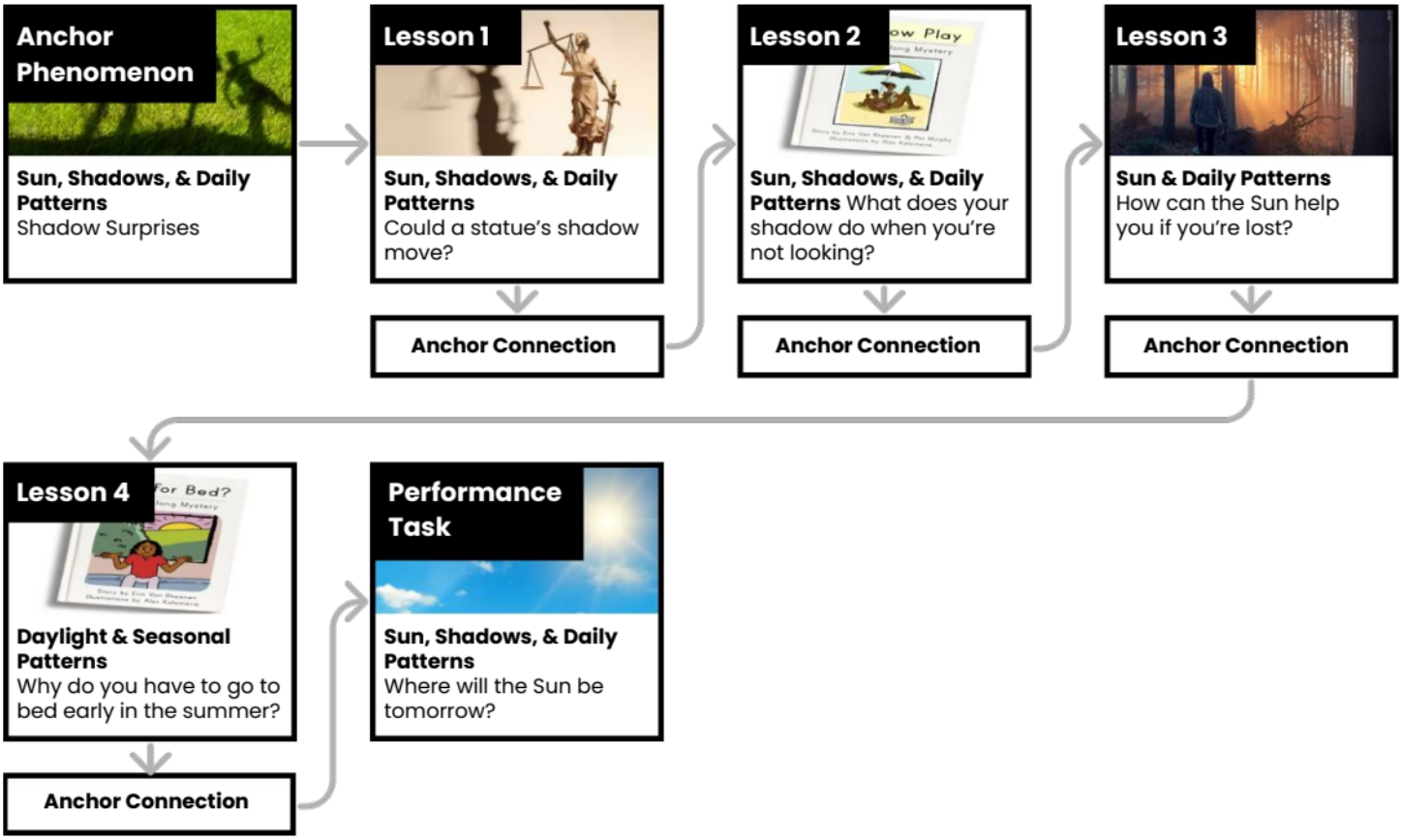


Day Patterns • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students make observations of the Sun and shadows throughout the day and across the seasons. They use their observations to understand patterns that occur throughout the day.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. • 1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.	• Analyzing and Interpreting Data • Planning and Carrying Out Investigations • Developing and Using Models • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• ESS1.A: The Universe and its Stars • ESS1.B: Earth and the Solar System	• Patterns

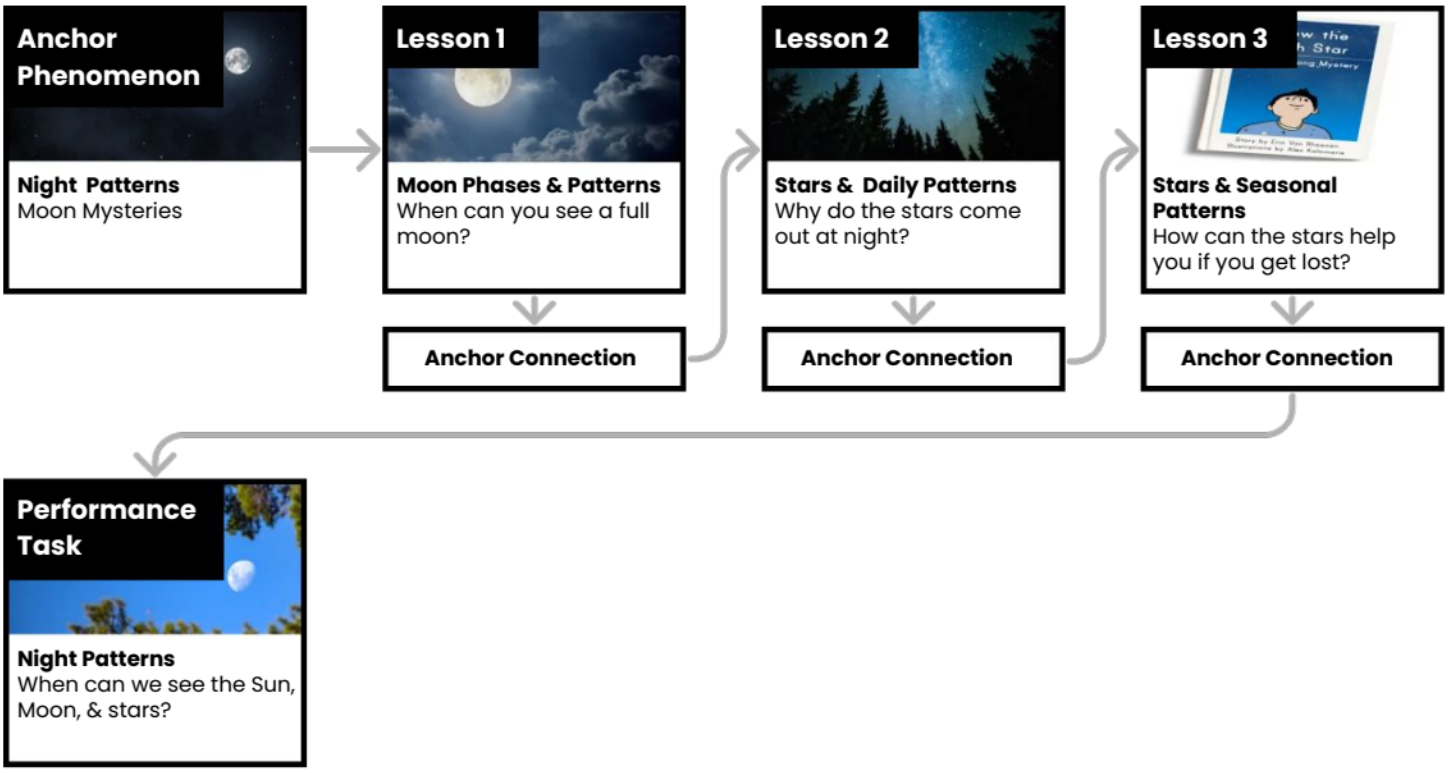


Night Patterns • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore the Moon and stars. They observe and record the appearance of the Moon to determine its cyclical pattern. They also determine why stars are only visible at night.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.	• Analyzing and Interpreting Data • Planning and Carrying Out Investigations • Developing and Using Models • Constructing Explanations and Designing Solutions • Obtaining, Evaluating, and Communicating Information	• ESS1.A: The Universe and its Stars	• Patterns • Cause and Effect

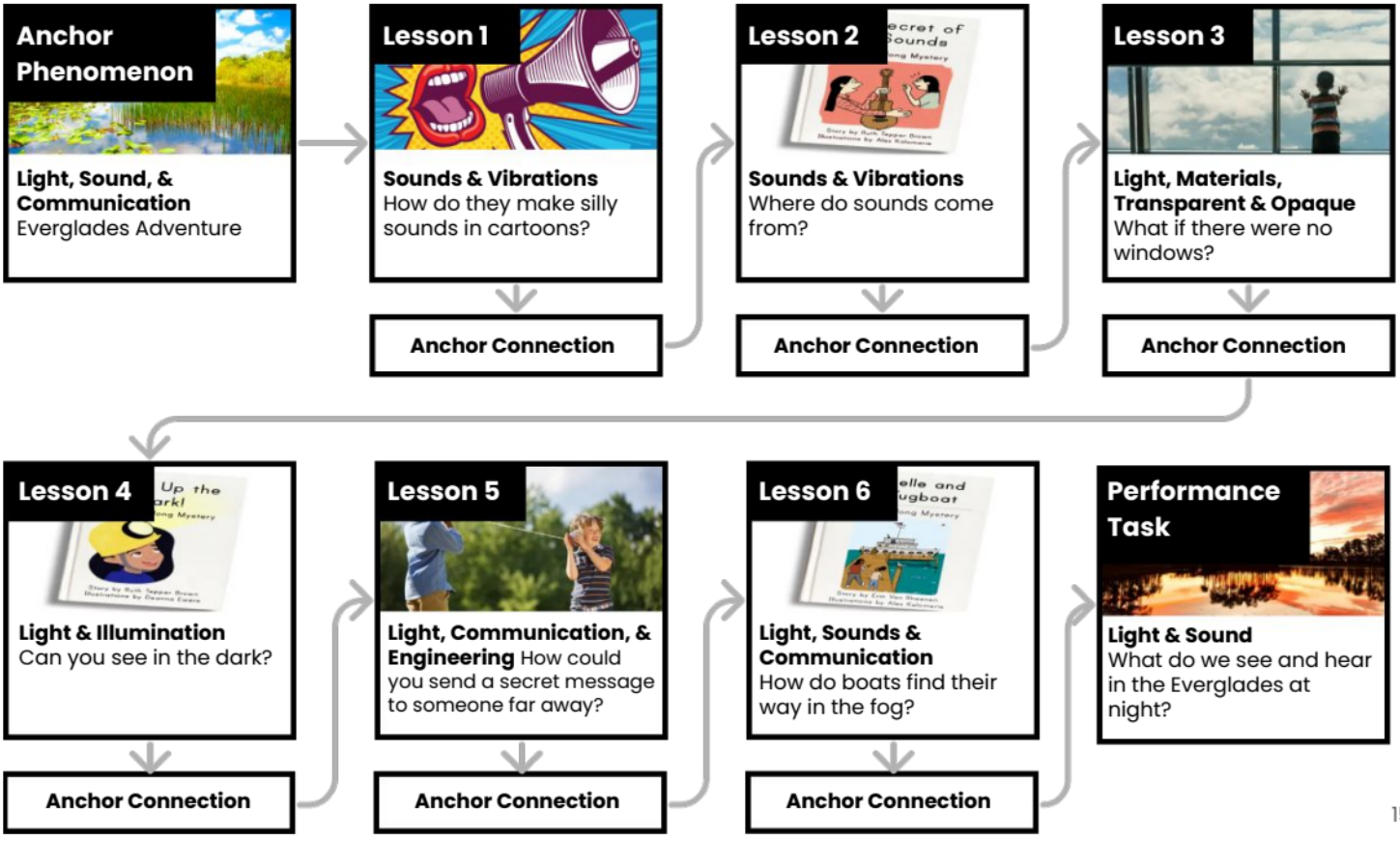


Light, Sound, & Communication • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students investigate light and sound! They explore how materials vibrate and how vibrating materials can make sounds. They also investigate light and illumination and use those investigations to create simple devices that allow them to communicate across a distance.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. • 1-PS4-2. Make observations to construct an evidence- based account that objects can be seen only when illuminated. • 1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light • 1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. • K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	• Constructing Explanations and Designing Solutions • Planning and Carrying Out Investigations • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• PS4.A: Wave Properties • PS4.B: Electromagnetic Radiation • PS4.C: Information Technologies and Instrumentation • ETS1.B: Developing Possible Solutions	• Cause and Effect • Patterns

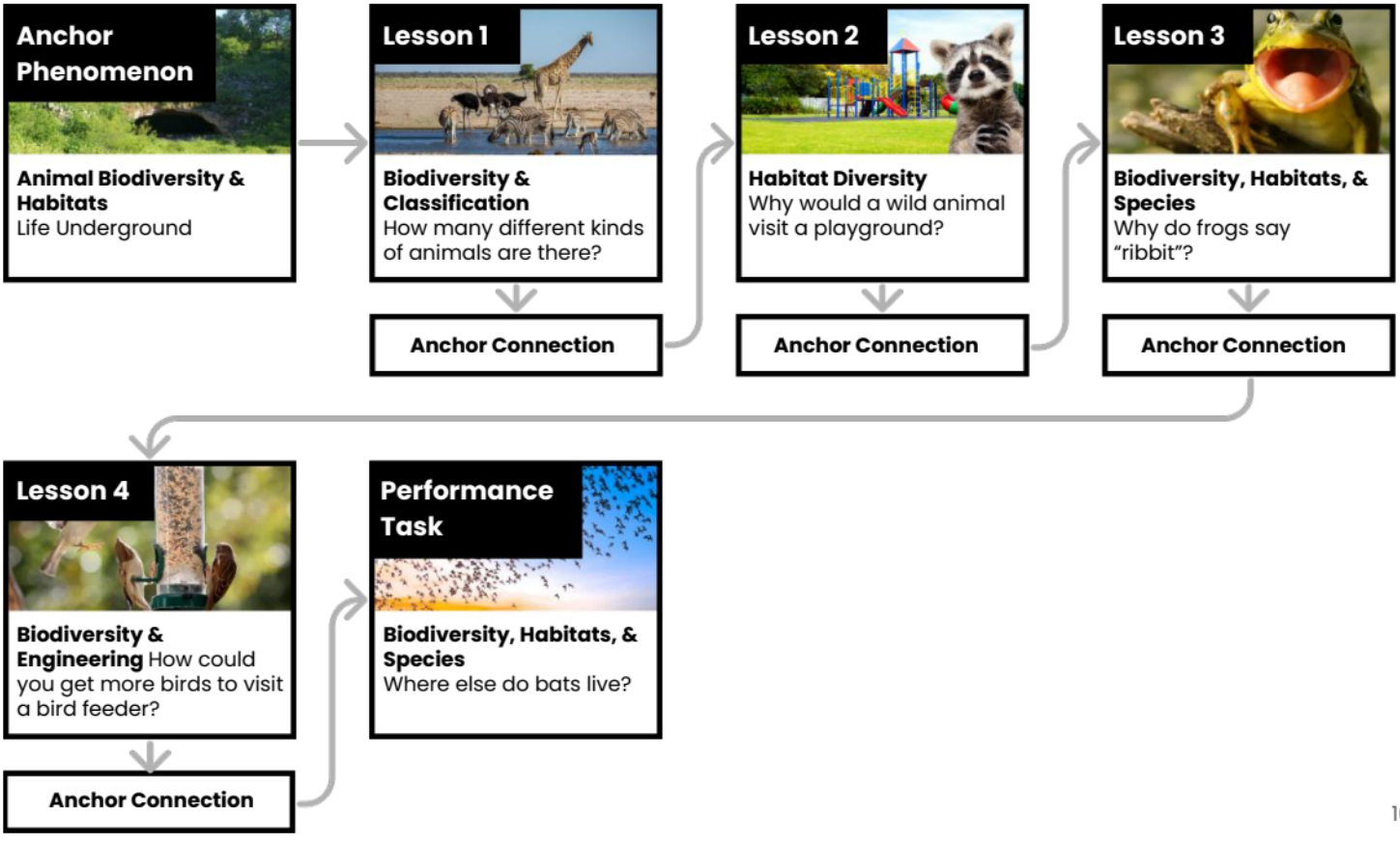


Animal Adaptations • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore the incredible diversity of animals and habitats! They investigate animal classification and the traits that define each group. Students then explore habitats to discover how the living and non-living aspects of the environment affect the diversity of organisms. They use this information to design a bird feeder that will attract birds with specific food preferences. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. • K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	• Obtaining, Evaluating, and Communicating Information • Analyzing and Interpreting Data • Planning and Carrying Out Investigations • Engaging in Argument from Evidence • Asking Questions and Defining Problems • Constructing Explanations and Designing Solutions • Developing and Using Models	• LS4.D: Biodiversity and Humans	• Patterns • Cause and Effect

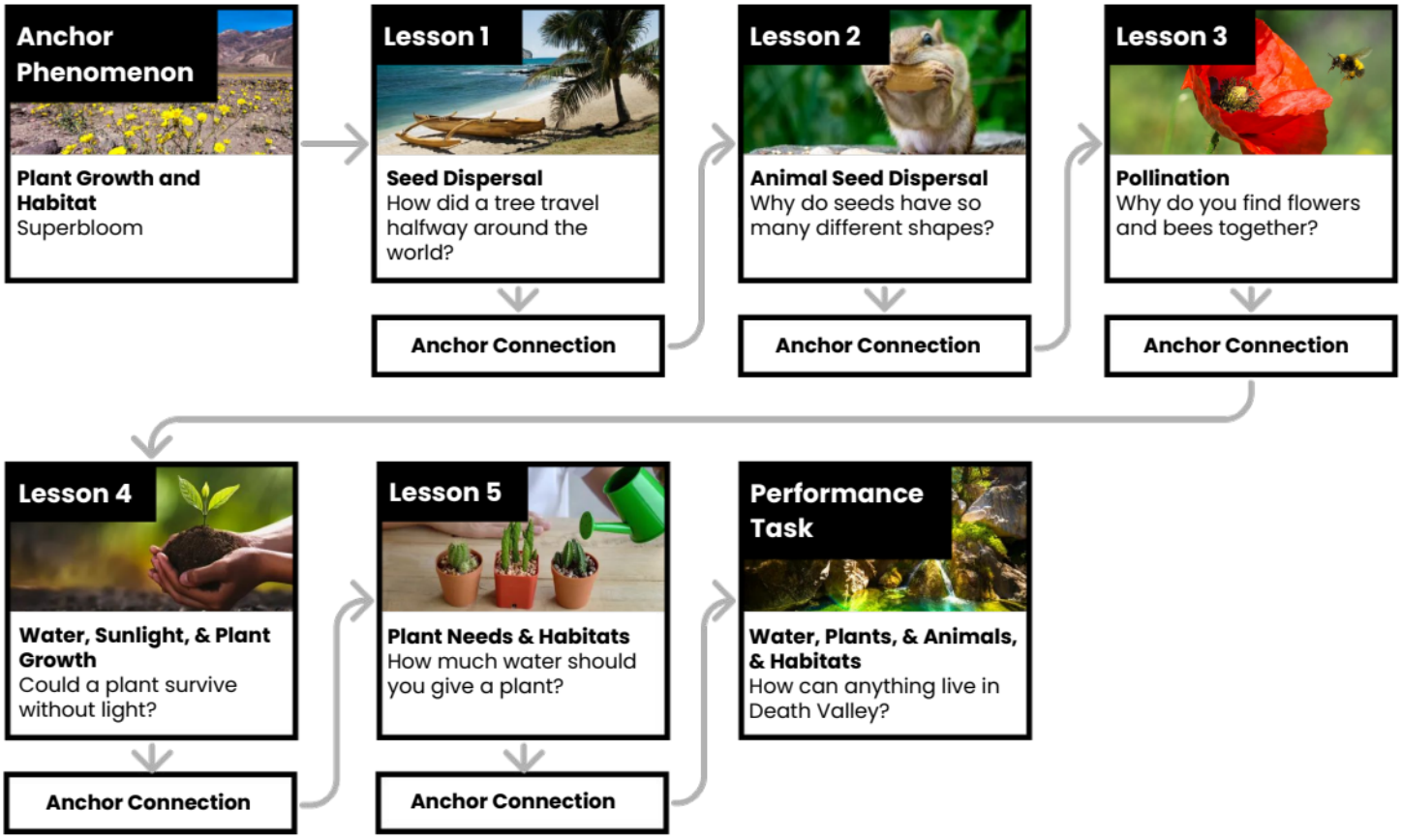


Plant Growth & Interactions • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore how plants interact with the environment to meet their needs. Students build models of seeds to explore how and why plants disperse their seeds. Students also conduct hands-on investigations to determine what those seeds need in order to grow, and what the adult plants need in order to survive and thrive. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. • 2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. • 2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	• Developing and Using Models • Planning and Carrying Out Investigations • Analyzing and Interpreting Data	• LS2.A: Interdependent Relationships in Ecosystems	• Structure and Function • Cause and Effect



Erosion & Earth's Surface • Unit Summary (pg 1 of 2)

See Anchor Layer Teacher Guide

In this unit, students explore maps, landforms, and bodies of water. They construct models of mountains to demonstrate how water flows downhill, and in the process, transforms huge rocks into the tiny grains of sand we find at the beach. Students also use models to demonstrate how erosion can happen slowly over time, but can also happen very quickly with landslides. They use this information to design solutions to slow down erosion and prevent landslides. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly. • 2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. • 2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. • 2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid. • K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. • K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	• Developing and Using Models • Planning and Carrying Out Investigations • Constructing Explanations and Designing Solutions	• ESS2.B: Plate Tectonics and Large-Scale System Interactions • ESS2.C: The Roles of Water in Erosion & Earth's Surface • ESS1.C: The History of Planet Earth • ESS2.A: Earth Materials and Systems	• Patterns • Cause and Effect • Stability and Change

Unit Lesson Flow on Next Page

Erosion & Earth's Surface • Lesson Flow (pg 2 of 2)

Anchor Phenomenon



Mapping, Earth's Surface Features, & Erosion
Strange River

Lesson 1



Mapping Landforms & Bodies of Water
Where's the best place to hide a treasure?

Anchor Connection

Lesson 2



Mapping & Earth's Surface Features If you floated down a river, where would you end up?

Anchor Connection

Lesson 3



Rocks, Sand, & Erosion
Why is there sand at the beach?

Anchor Connection

Lesson 4



Mapping & Severe Weather
Where do flash floods happen?

Anchor Connection

Lesson 5



Erosion, Earth's Surface, & Landforms
What's strong enough to make a canyon?

Anchor Connection

Lesson 5



Erosion & Engineering
How can you stop a landslide?

Anchor Connection

Performance Task



Mapping & Earth's Surface Features
How long is the shortest river?

Material Properties • Unit Summary (pg 1 of 2)

See Anchor Layer Teacher Guide

In this unit, students explore the properties of materials! They describe and classify different types of materials by properties like hardness, flexibility, absorbency, and the ability to conduct heat. Then, they determine which materials have properties best suited for certain types of clothing, cooking, or buildings. They also build card towers to explore how a small set of the same pieces can be disassembled and then reconstructed into a new object with different characteristics. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. • 2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. • 2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. • 2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. • K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. • K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	• Asking Questions and Defining Problems • Planning and Carrying Out Investigations • Constructing Explanations and Designing Solutions • Analyzing and Interpreting Data • Developing and Using Models	• PS1.A: Structure and Properties of Matter • PS1.B: Chemical Reactions • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution	• Structure and Function • Cause and Effect • Energy and Matter • Patterns

Unit Lesson Flow on Next Page

Material Properties • Lesson Flow (pg 2 of 2)

Anchor Phenomenon



Materials & Properties
Melting Metal

Lesson 1



Material Properties & Engineering
Why do we wear clothes?

Anchor Connection

Lesson 2



Classify Materials: Insulators
Can you really fry an egg on a hot sidewalk?

Anchor Connection

Lesson 3



Materials, Properties, & Engineering
Could you build a house out of paper?

Anchor Connection

Lesson 4



Soil Properties
How do you build a city out of mud?

Anchor Connection

Performance Task

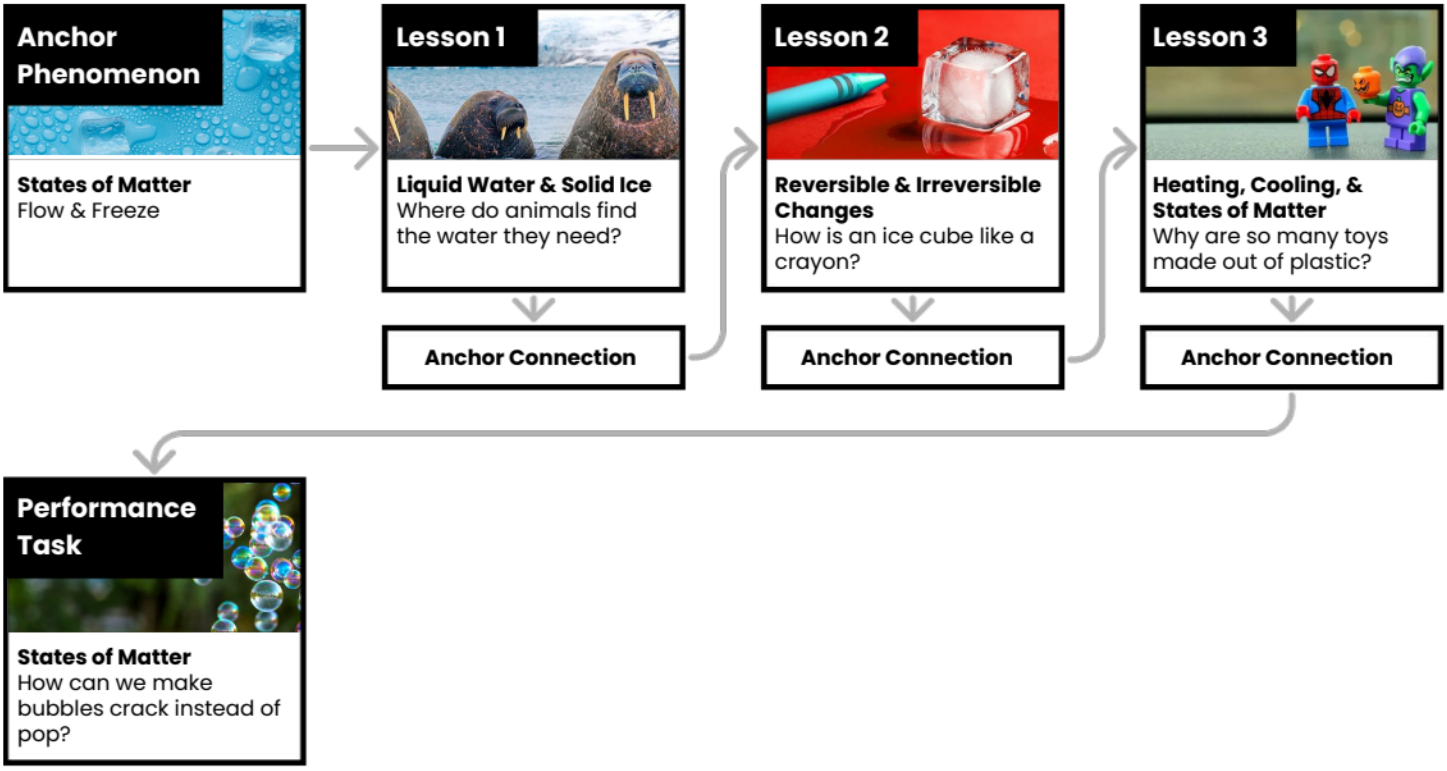


Materials & Properties
How do we recycle metal?

States of Matter • Unit Summary

In this unit, students explore solid and liquid states of matter! They explore how water is found around the world and can be frozen solid into ice. Students also investigate other materials besides water and observe their properties to construct an explanation that some changes are reversible, while others are not.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid. • 2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. • 2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	• Obtaining, Evaluating, and Communicating Information • Analyzing and Interpreting Data • Engaging in Argument from Evidence	• PS1.A: Structure and Properties of Matter • PS1.B: Chemical Reactions • ESS2.C: The Roles of Water in Earth's Surface Processes	• Patterns • Cause and Effect

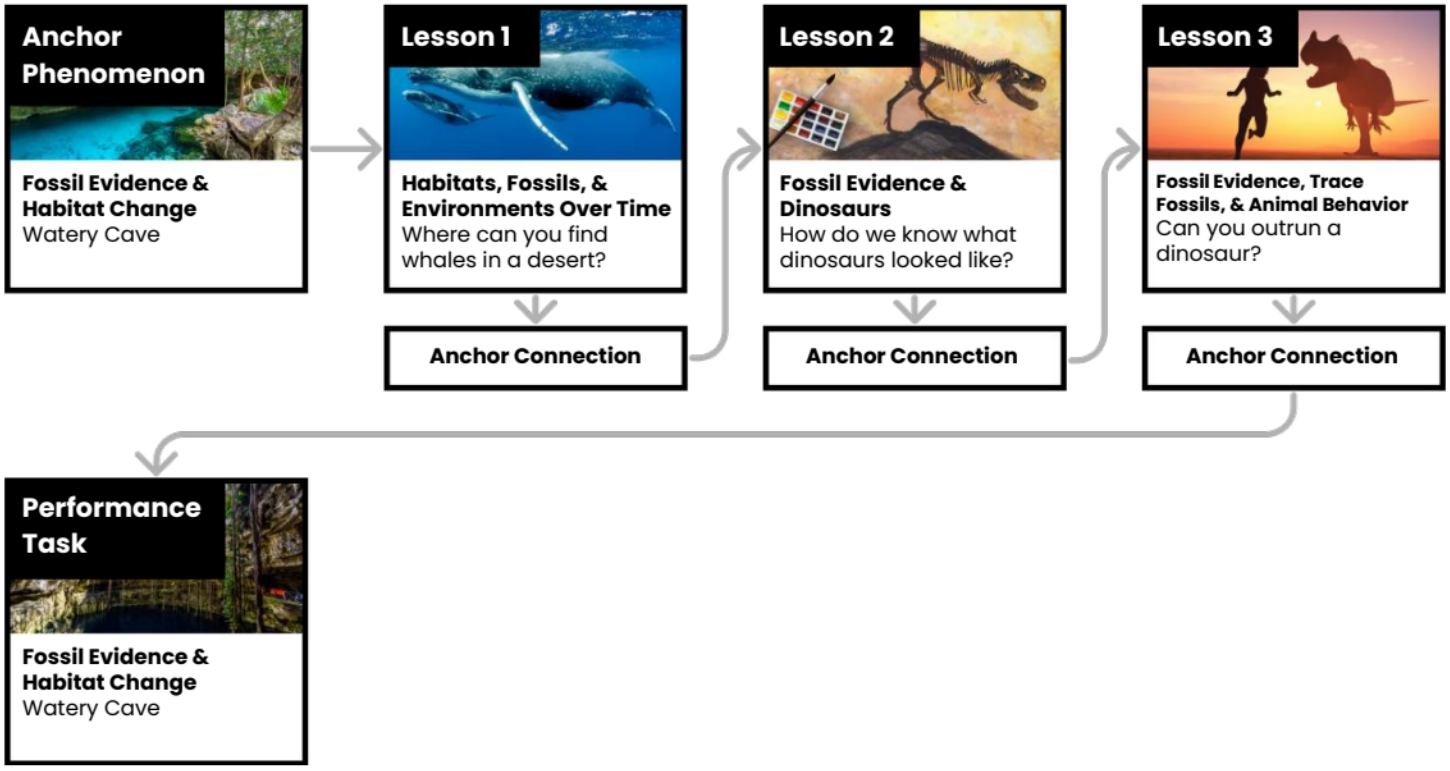


Fossils & Changing Environments • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students develop an understanding of how animals and their environments have changed through time. The anchor phenomenon for this unit is a water-filled cave that contains footprints, fossils, and ancient fire pits. Fossils provide a window into the animals and habitats of the past. Analyzing the traits of animals that are alive today and comparing them to fossils, provides evidence of how these ancient organisms and environments of the past may have appeared. The anchor phenomenon for this unit is a water-filled cave that contains footprints, fossils, and ancient fire pits. How can these things be found deep underwater? Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.	• Analyzing and Interpreting Data • Engaging in Argument from Evidence • Using Mathematics and Computational Thinking • Planning and Carrying Out Investigations	• LS4.A: Evidence of Common Ancestry and Diversity	• Scale, Proportion, and Quantity • Structure and Function • Patterns



Life Cycles • Unit Summary (pg 1 of 2)

See Anchor Layer Teacher Guide

In this unit, students compare and contrast the life cycles of both animals and plants. Students create models to build an understanding that all organisms share certain stages in their life cycles: birth, growth, reproduction, and death. Students also explore how an understanding of life cycles can aid in solving problems that occur when there are too many or too few organisms in a particular environment.

Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 3-LS2-1. Construct an argument that some animals form groups that help members survive. • 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. • 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. • 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. • 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	• Analyzing and Interpreting Data • Constructing Explanations and Designing Solutions • Planning and Carrying Out Investigations • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• LS3.A: Inheritance of Traits • LS3.B: Variation of Traits • LS4.B: Natural Selection • LS4.C: Adaptation • LS2.D: Social Interactions and Group Behavior	• Patterns • Cause and Effect • Systems and System Models • Stability and Change

Unit Lesson Flow on Next Page

Life Cycle • Lesson Flow (pg 2 of 2)

Anchor Phenomenon



Life Cycles
Saguaro Cycles

Lesson 1



Animal Life Cycles
How is your life like an alligator's life?

Anchor Connection

Lesson 2



Environmental Change & Engineering
What's the best way to get rid of mosquitoes?

Anchor Connection

Lesson 3



Pollination & Plant Reproduction
Why do plants grow flowers?

Anchor Connection

Lesson 4



Fruit, Seeds, & Plant Reproduction
Why do plants give us fruit?

Anchor Connection

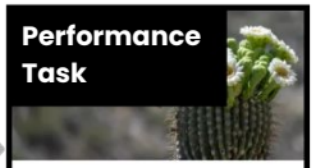
Lesson 5



Plant Life Cycles
Why are there so many different kinds of flowers?

Anchor Connection

Performance Task



Life Cycles
Why are some saguaros so tiny?

Heredity, Survival, & Selection • Unit Summary (pg 1 of 2)

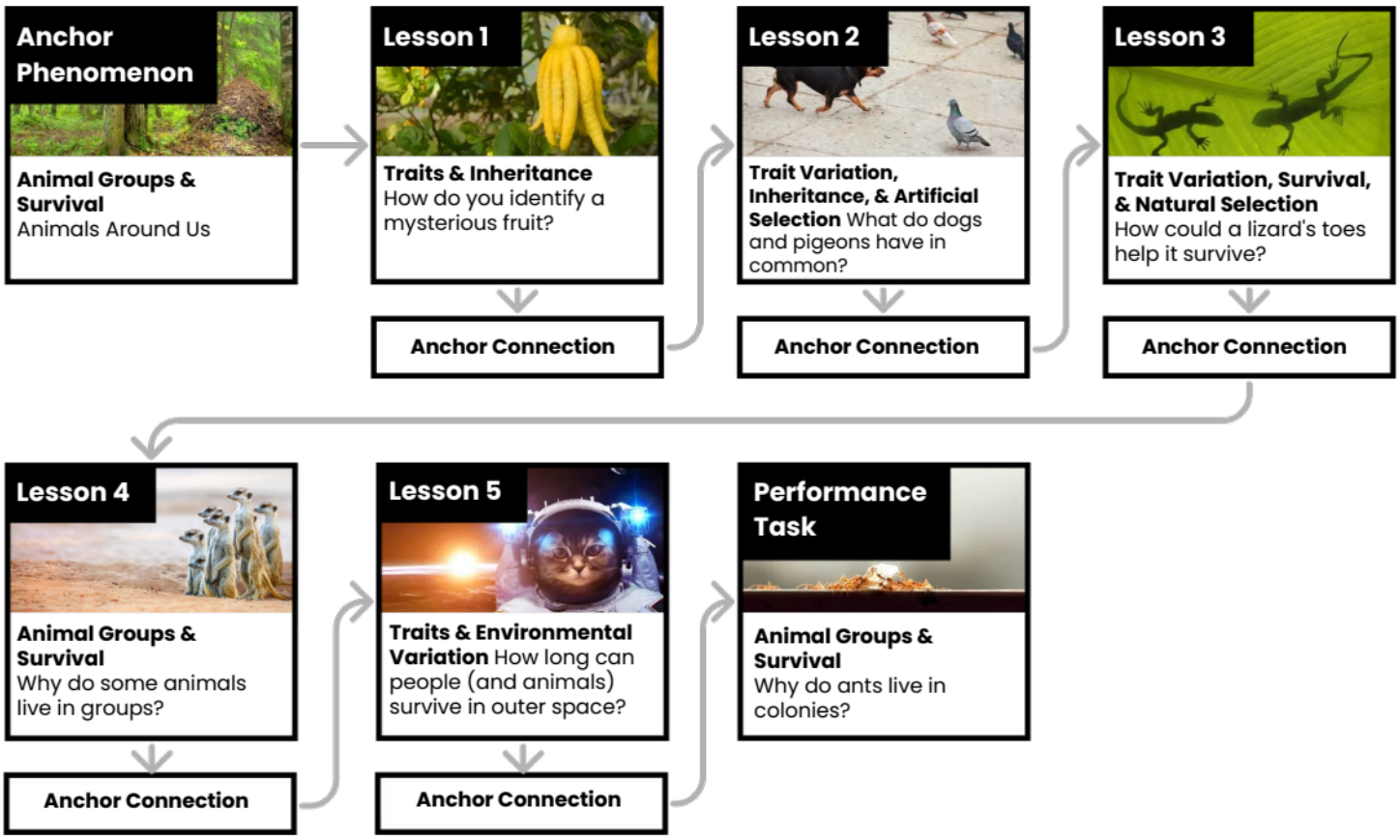
See Anchor Layer Teacher Guide

In this unit, students explore the inherited and acquired traits of plants and animals. Analyzing traits provides evidence for how those traits vary, how they are inherited, and how they have changed over time through both artificial and natural selection. Students also examine how a particular environment can affect traits, including inherited traits that provide animals with an advantage for survival. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 3-LS2-1. Construct an argument that some animals form groups that help members survive. • 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms • 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. • 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. • 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	• Analyzing and Interpreting Data • Constructing Explanations and Designing Solutions • Planning and Carrying Out Investigations • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• LS3.A: Inheritance of Traits • LS3.B: Variation of Traits • LS4.B: Natural Selection • LS4.C: Adaptation • LS2.D: Social Interactions and Group Behavior	• Systems and System Models • Patterns • Stability and Change • Cause and Effect

Unit Lesson Flow on Next Page

Heredity, Survival, & Selection • Lesson Flow (pg 2 of 2)



Weather & Climate • Unit Summary (pg 1 of 2)

See Anchor Layer Teacher Guide

In this unit, students explore weather and climate patterns. They make predictions about the weather through careful observations of the clouds, wind, temperature, and precipitation. Students also learn to differentiate between weather and climate and use models to reveal global climate patterns. They use this information to design solutions that reduce the impacts of severe weather events like windstorms.
Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. • 3-ESS2-2. Obtain and combine information to describe climates in different regions of the world. • 3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. • 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. • 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Planning and Carrying Out Investigations • Developing and Using Models • Analyzing and Interpreting Data • Obtaining, Evaluating, and Communicating Information • Asking Questions and Defining Problems • Constructing Explanations and Designing Solutions	• ESS2.D: Weather and Climate • ESS3.B: Natural Hazards • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution	• Structure and Function • Stability and Change • Cause and Effect • Patterns

Unit Lesson Flow on Next Page

Weather & Climate • Lesson Flow (pg 2 of 2)

Anchor Phenomenon



Weather System Modeling
Summer Ice Storm

Lesson 1



Water Cycle & States of Matter
Where do clouds come from?

Anchor Connection

Lesson 2



Local Weather Patterns & Weather Prediction
How can we predict when it's going to storm?

Anchor Connection

Lesson 3



Seasonal Weather Patterns
Where's the best place to build a snow fort?

Anchor Connection

Lesson 4



Climate & Global Weather Patterns
Why are some places always hot?

Anchor Connection

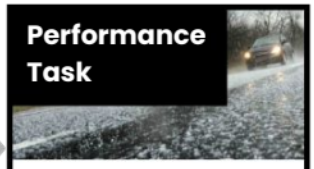
Lesson 5



Natural Hazards & Engineering How can you keep a house from blowing away in a windstorm?

Anchor Connection

Performance Task



Weather and Climate
Can we predict when it's going to hail?

Forces, Motion, & Magnets • Unit Summary (pg 1 of 2)

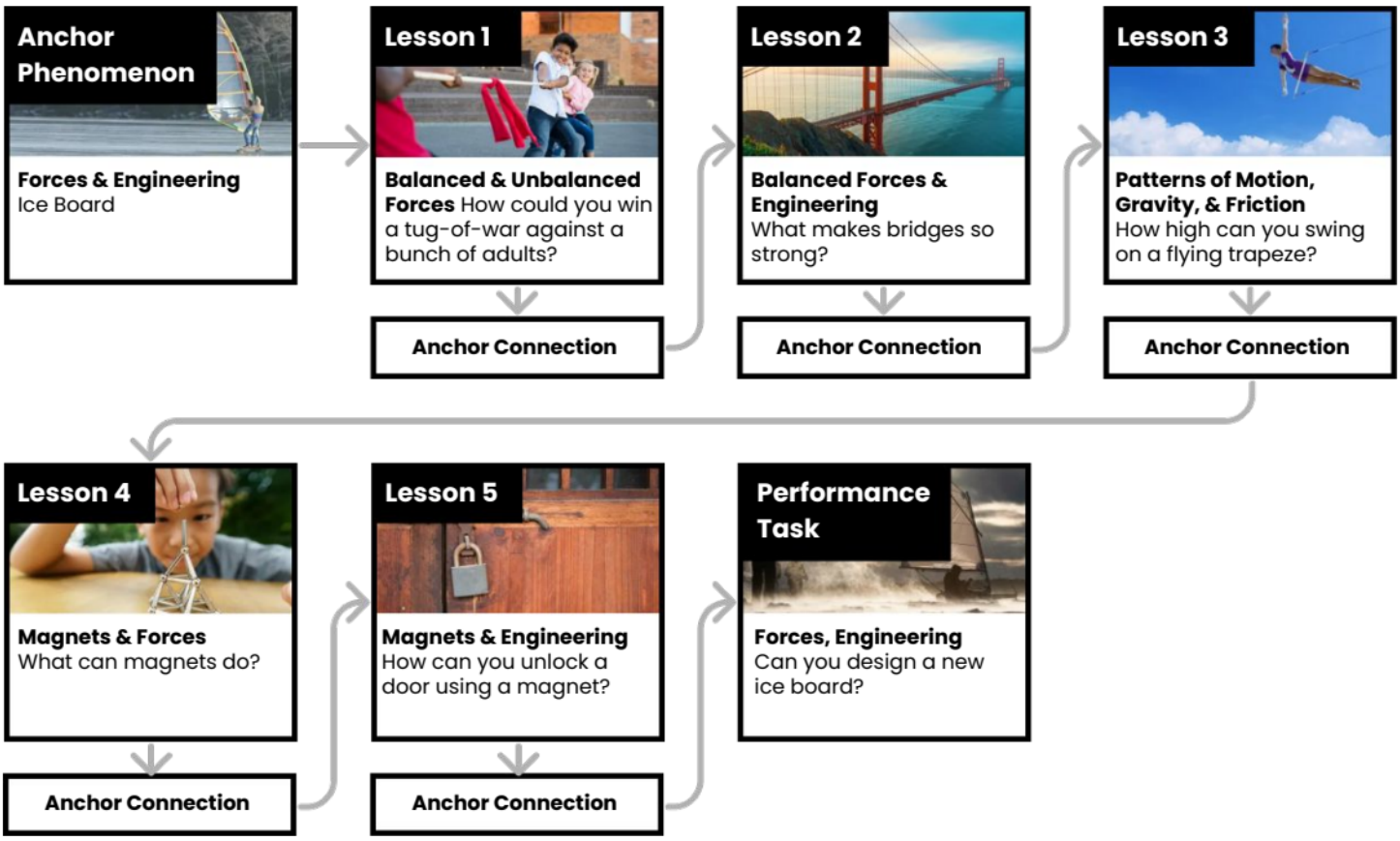
See Anchor Layer Teacher Guide

In this unit, students explore the forces all around them. They investigate the effects of balanced and unbalanced forces, the pushes and pulls of bridge structures, and the effects of gravity and friction on the motion of objects. Students also explore the power of magnetic forces and design solutions to everyday problems using their knowledge of these forces. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. • 3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.. • 3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. • 3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets. • 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. • 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Planning and Carrying Out Investigations • Developing and Using Models • Asking Questions and Defining Problems • Constructing Explanations and Designing Solutions	• PS2.A: Forces and Motion • PS2.B: Types of Interactions • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution	• Structure and Function • Cause and Effect • Patterns

Unit Lesson Flow on Next Page

Forces, Motion, & Magnets • Lesson Flow (pg 2 of 2)

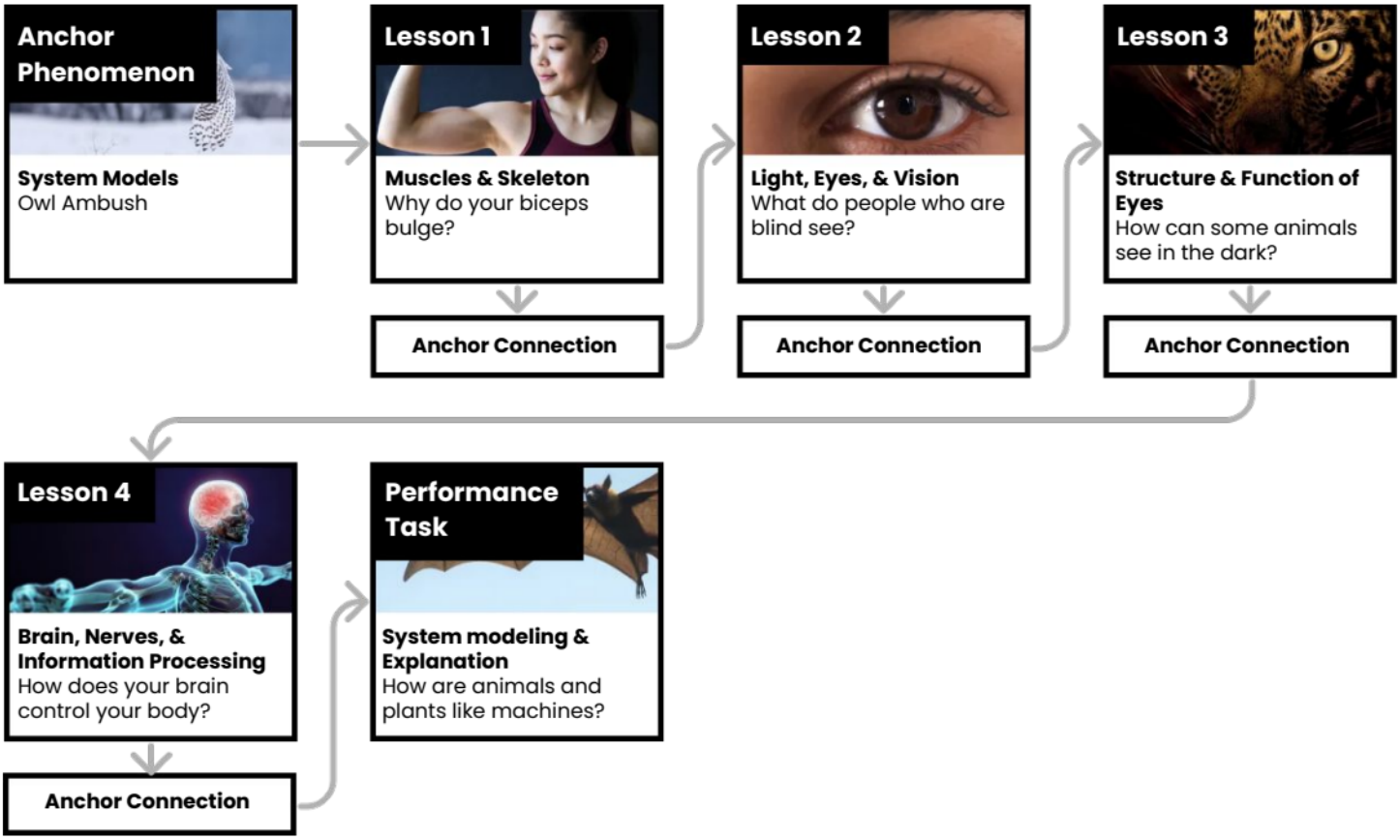


Human Body, Vision, & The Brain • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students investigate structures and functions of the human body. Students explore how our bones and muscles are interconnected, how our eyes interact with light and impact our vision, and how our brain responds to stimuli in our environment. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. • 4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. • 4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	• Planning and Carrying Out Investigations • Developing and Using Models • Analyzing and Interpreting Data • Constructing Explanations and Designing Solutions	• LS1.A: Structure and Function • PS4.B: Electromagnetic Radiation • LS1.D: Information Processing	• Systems and System Models • Cause and Effect

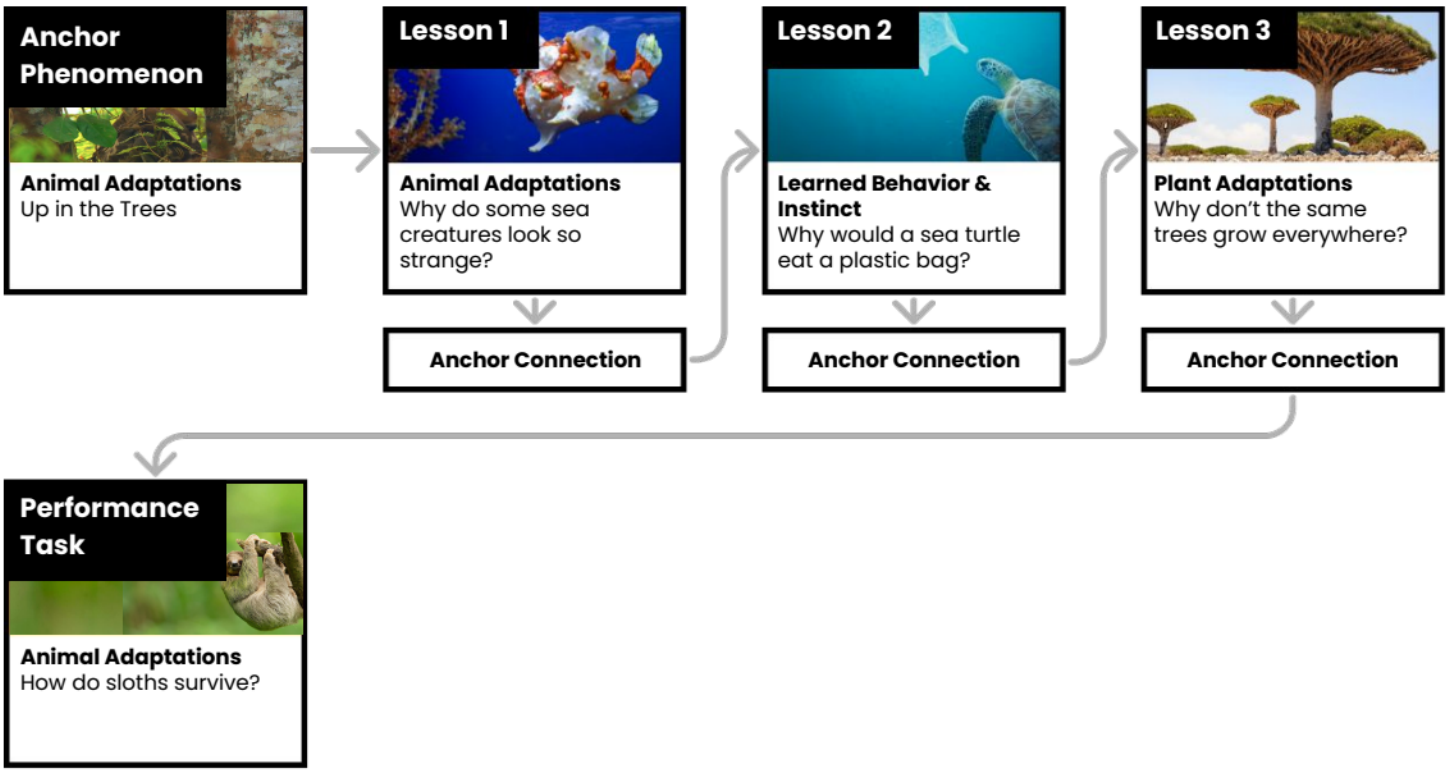


Animal & Plant Adaptations • Unit Summary

See Teacher Guide

In this unit, students explore the adaptations of animals and plants. Students investigate how the external and internal structures of an organism work together as an interconnected system that aid in their growth and survival. They also use models to explore how a combination of instincts and memories influence animal behavior.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. • 4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	• Engaging in Argument from Evidence • Developing and Using Models • Constructing Explanations and Designing Solutions	• LS1.A: Structure and Function • LS1.D: Information Processing	• Systems and System Models



Earth's Features & Processes • Unit Summary (pg 1 of 2)

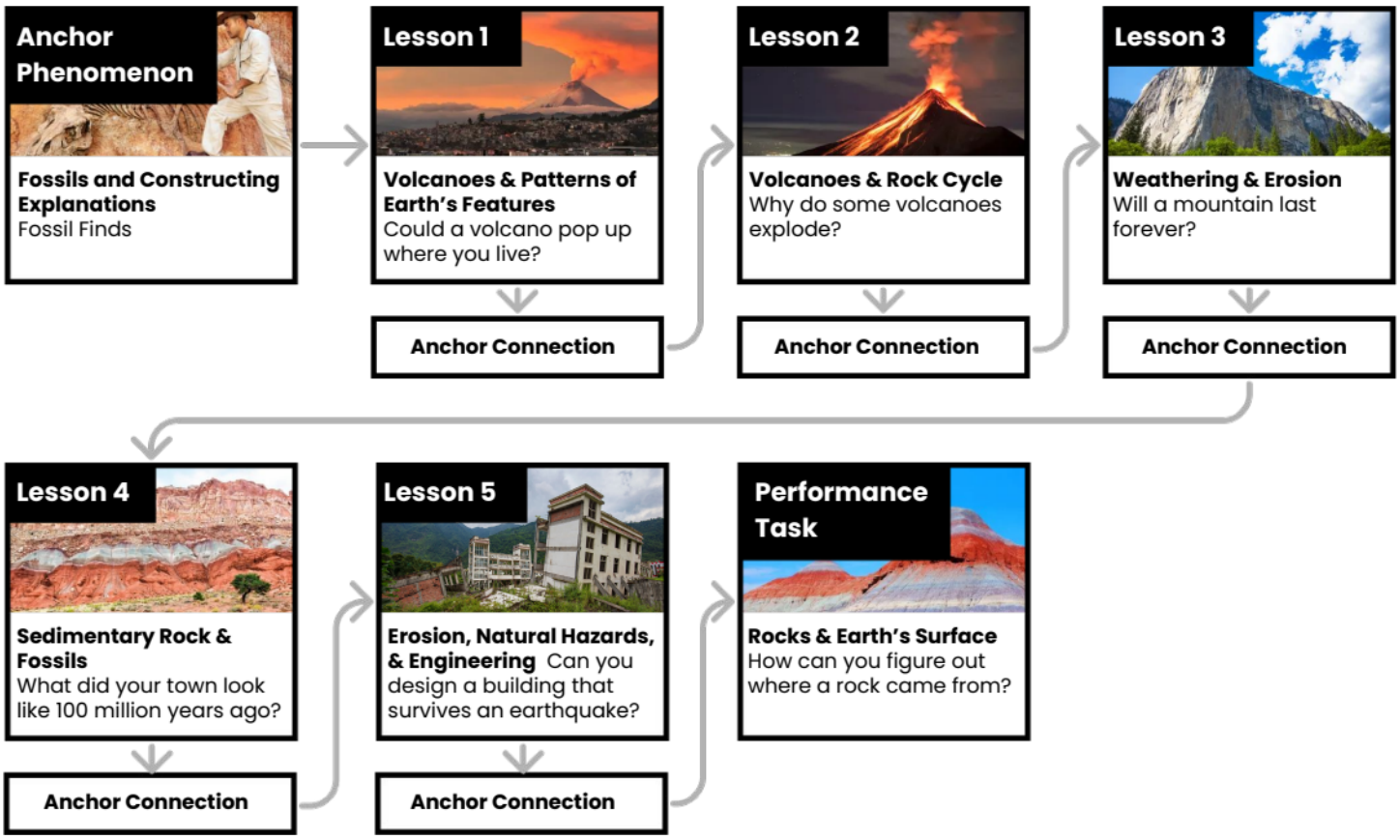
See Anchor Layer Teacher Guide

In this unit, students investigate features and processes of the Earth's surface. Students explore the rapid process of volcanic eruptions! In contrast, students also explore the gradual Earth processes of weathering and erosion. Students apply their knowledge and design solutions to mitigate the impacts of these processes on humans. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. • 4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation • 4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features. • 4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. • 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem	• Analyzing and Interpreting Data • Engaging in Argument from Evidence • Constructing Explanations and Designing Solutions • Planning and Carrying Out Investigations • Constructing Explanations and Designing Solutions • Developing and Using Models	• ETS1.B: Designing Solutions to Engineering Problems • ESS1.C: The History of Planet Earth • ESS2.A: Earth Materials and Systems • ESS2.B: Plate Tectonics and Large-Scale System Interactions • ESS2.E: Biogeology • Ess3.B: Natural Hazards •ETS1.B: Designing Solutions to Engineering Problems	• Patterns • Cause and Effect

Unit Lesson Flow on Next Page

Earth's Features & Processes • Lesson Flow (pg 2 of 2)

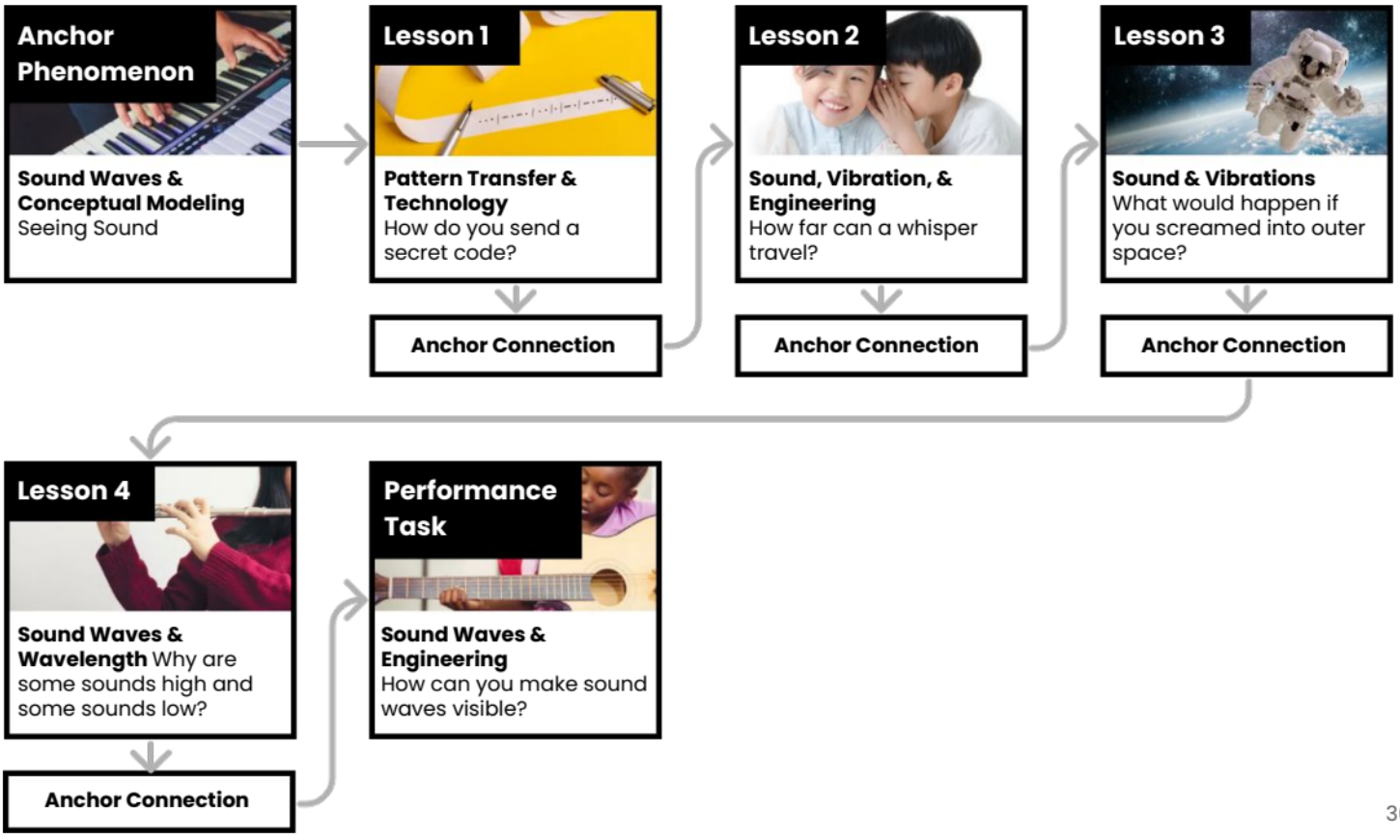


Sound, Waves, & Communication • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students investigate the science of sound. Students construct physical devices to feel the vibrations that allow us to communicate across distances. Students also use digital devices to visualize the characteristics of different sound waves that cause us to hear different things. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. • 4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information. • 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. • 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Planning and Carrying Out Investigations • Developing and Using Models • Constructing Explanations and Designing Solutions	• PS4.A: Wave Properties • PS4.C: Information Technologies and Instrumentation • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution	• Patterns

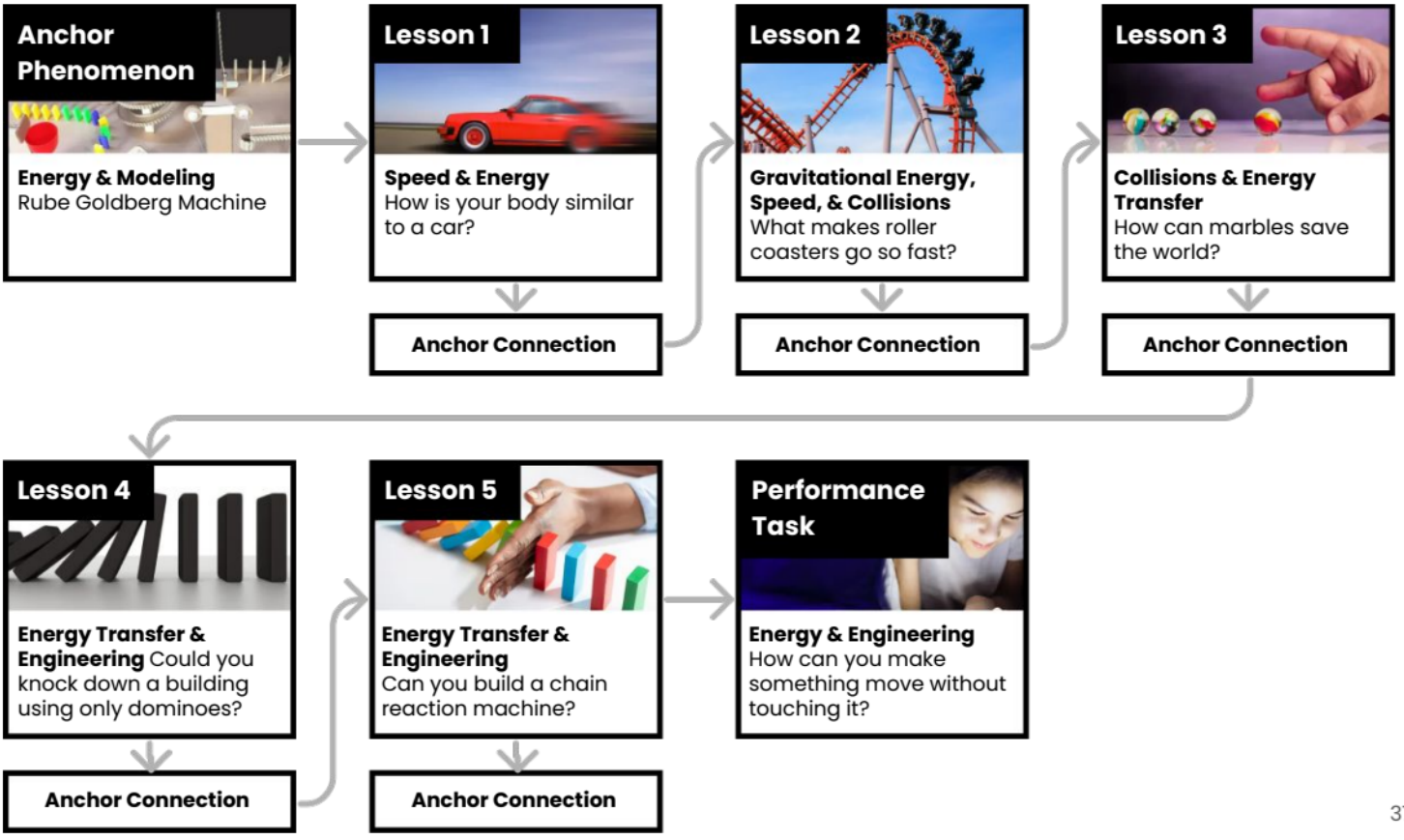


Energy & Energy Transfer • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore energy! Students investigate how energy is stored, how it can make objects move, and how collisions transfer energy between objects. Students also construct chain reaction machines to explore the many different ways that energy can be transferred. Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. • 4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide. • 4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. • 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. • 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Analyzing and Interpreting Data • Developing and Using Models • Constructing Explanations and Designing Solutions • Asking Questions and Defining Problems	• PS3.A: Definitions of Energy • PS3.B: Conservation of Energy and Energy Transfer • PS3.C: Relationship Between Energy and Forces • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution	• Energy and Matter • Systems and System Models

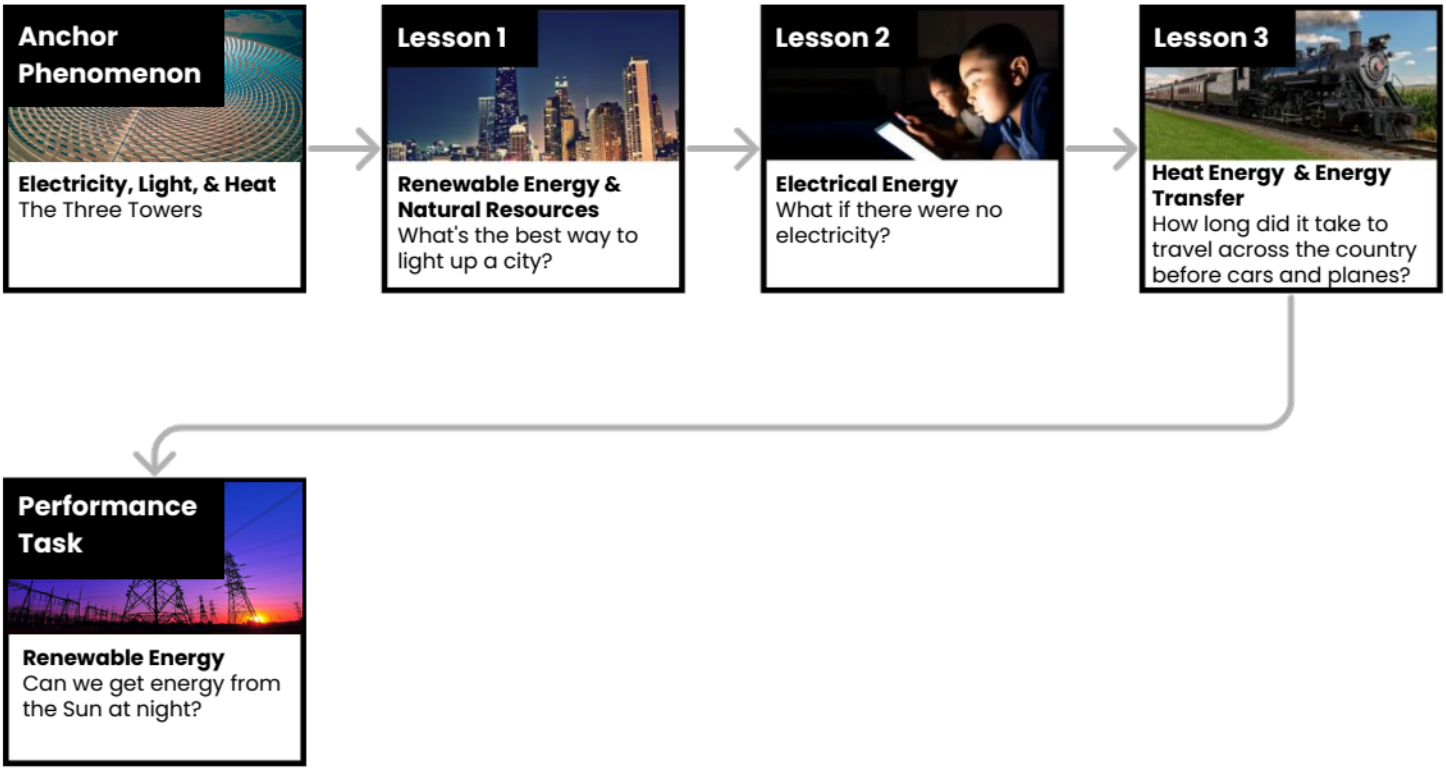


Electricity, Light, & Heat • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore the different forms of energy! Students investigate how energy can change form from heat energy into electrical energy. Students also construct devices that convert energy from one form into another, such as heat into motion and electricity into light.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. • 4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. • 4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. • 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Obtaining, Evaluating, and Communicating Information • Using Mathematics and Computational Thinking • Developing and Using Models • Constructing Explanations and Designing Solutions • Planning and Carrying Out Investigations	• SS3.A: Natural Resources • PS3.D: Energy in Chemical Processes and Everyday Life • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution • PS3.B: Conservation of Energy and Energy Transfer	• Energy and Matter • Cause and Effect



Ecosystems & The Food Web • Unit Summary (pg 1 of 2)

See Anchor Layer Teacher Guide

In this unit, students explore how consumers, producers, and decomposers each play an important role in ecosystems. They build models of food chains and food webs to investigate how matter and energy flow through these systems. Students discover that matter continuously cycles between non-living and living components of the environment and consider ways that we can protect those environments.

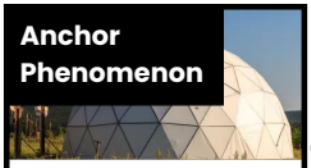
Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. • 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. • 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. • 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.	• Planning and Carrying Out Investigations • Developing and Using Models • Obtaining, Evaluating, and Communicating Information • Constructing Explanations and Designing Solutions • Planning and Carrying Out Investigations • Analyzing and Interpreting Data	• LS2.A: Interdependent Relationships in Ecosystems • LS2.B: Cycles of Matter and Energy Transfer in Ecosystems • LS1.C. Organization for Matter and Energy Flow in Organisms • ESS3.C: Human Impacts on Earth Systems • PS3.D: Energy in Chemical Processes and Everyday Life	• Energy and Matter • Systems and System Models • Cause and Effect

Unit Lesson Flow on Next Page

Ecosystems & The Food Web • Lesson Flow (pg 2 of 2)

Anchor Phenomenon



Ecosystem Design & Modeling
Life Inside a Dome

Lesson 1



Food Chains & Matter Flow
What if all the ants disappeared?

Anchor Connection

Lesson 2



Decomposers & Matter Flow How does a tiny seed become one of the heaviest trees on Earth?

Anchor Connection

Lesson 3



Plant Growth & Matter
Where do fallen leaves go?

Anchor Connection

Lesson 4



Decomposers, Nutrients, & Matter Cycle
Do worms really eat dirt?

Anchor Connection

Lesson 5



Ecosystems & Matter Cycle
How could a fish feed a forest?

Anchor Connection

Lesson 6



Protecting Environments
How can we protect Earth's environments?

Anchor Connection

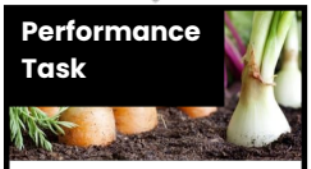
Lesson 7



Food Webs & Flow of Energy
Why did the dinosaurs go extinct?

Anchor Connection

Performance Task



Ecosystem Argument
How could we grow food on Mars?

Water Cycle & Earth's Systems • Unit Summary (pg 1 of 2)

See Anchor Layer Teacher Guide

In this unit, students consider the profound importance of water as a natural resource. Students investigate the distribution of fresh water and salt water on Earth. They explore how water cycles through Earth's systems, investigating how the hydrosphere and atmosphere interact. Students also consider how water affects human societies and design solutions to mitigate effects of weather-related natural hazards.
Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. • 5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. • 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. • 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Analyzing and Interpreting Data • Using Mathematics and Computational Thinking • Developing and Using Models • Obtaining, Evaluating, and Communicating Information • Engaging in Argument from Evidence • Planning and Carrying Out Investigations • Asking Questions and Defining Problems	• ESS2.A: Earth Materials and Systems • ESS2.C: The Roles of Water in Earth's Surface Processes • PS1.A: Structure and Properties of Matter • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution	• Scale, Proportion, and Quantity • Systems and System Models • Patterns

Unit Lesson Flow on Next Page

Water Cycle & Earth's Systems • Lesson Flow (pg 2 of 2)

Anchor Phenomenon



Interaction of Earth's Spheres & Modeling
Dust Bowl Disaster

Lesson 1



Hydrosphere & Water Distribution
How much water is there in the world?

Anchor Connection

Lesson 2



Mixtures & Solutions
How much salt is in the ocean?

Anchor Connection

Lesson 3



Groundwater as a natural resource
When you turn on the faucet, where does the water come from?

Anchor Connection

Lesson 4



Water Cycle
Can we make it rain?

Anchor Connection

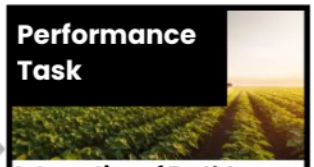
Lesson 5



Natural Disasters & Engineering
How can you save a town from a hurricane?

Anchor Connection

Performance Task



Interaction of Earth's Spheres & Argumentation
How can you protect a farm from the next Dust Bowl?

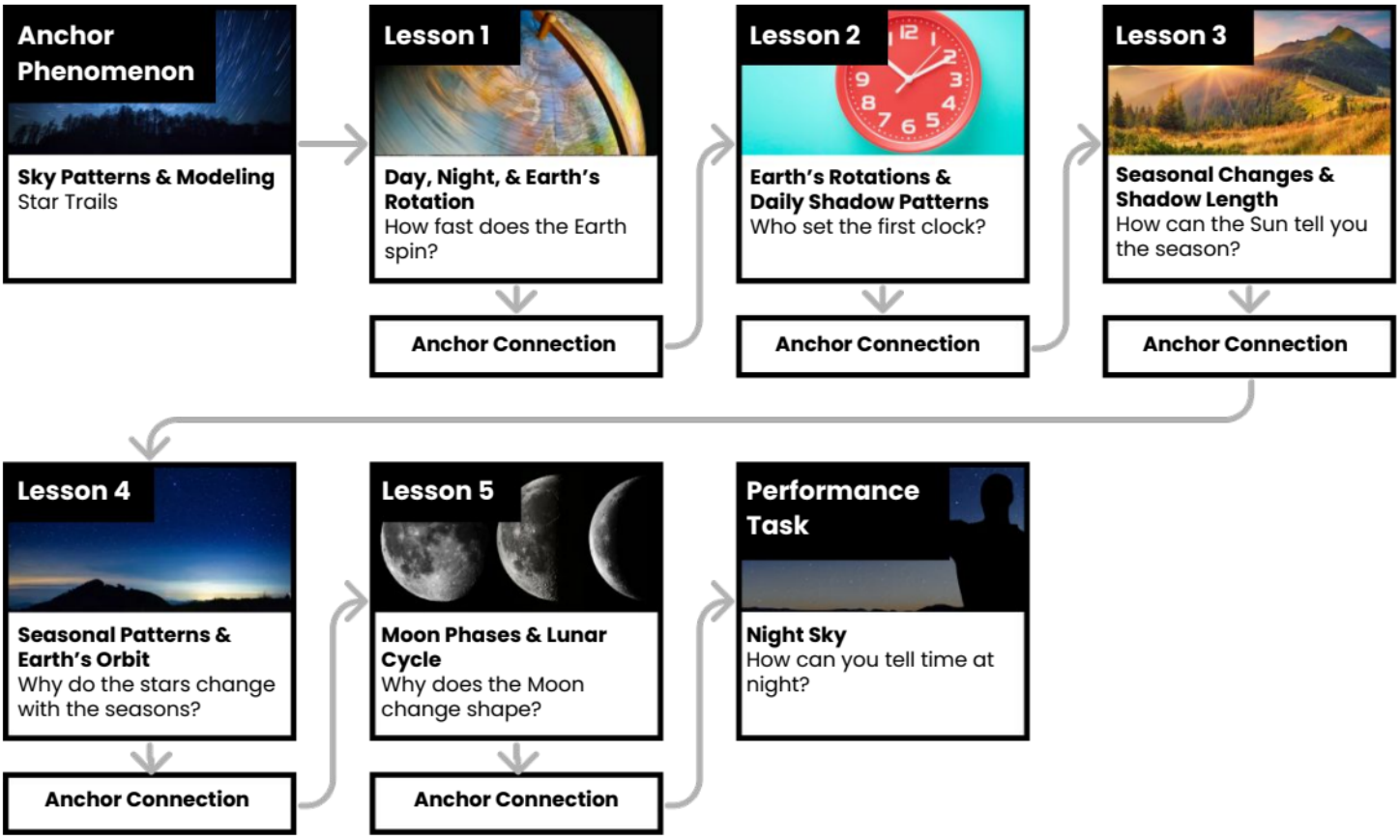
Earth & Space Patterns • Unit Summary

See Anchor Layer Teacher Guide

In this unit, students explore patterns of the Earth, Sun, Moon, and stars. They investigate how shadows change throughout the day, how the Sun's position changes throughout the year, and how stars change throughout the seasons. They also create Earth, Sun, and Moon models to explore Moon patterns.

Assessments

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	• Developing and Using Models • Using Mathematics and Computational Thinking • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Engaging in Argument from Evidence • Constructing Explanations and Designing Solutions	• ESS1.B: Earth and the Solar System	• Cause and Effect • Patterns

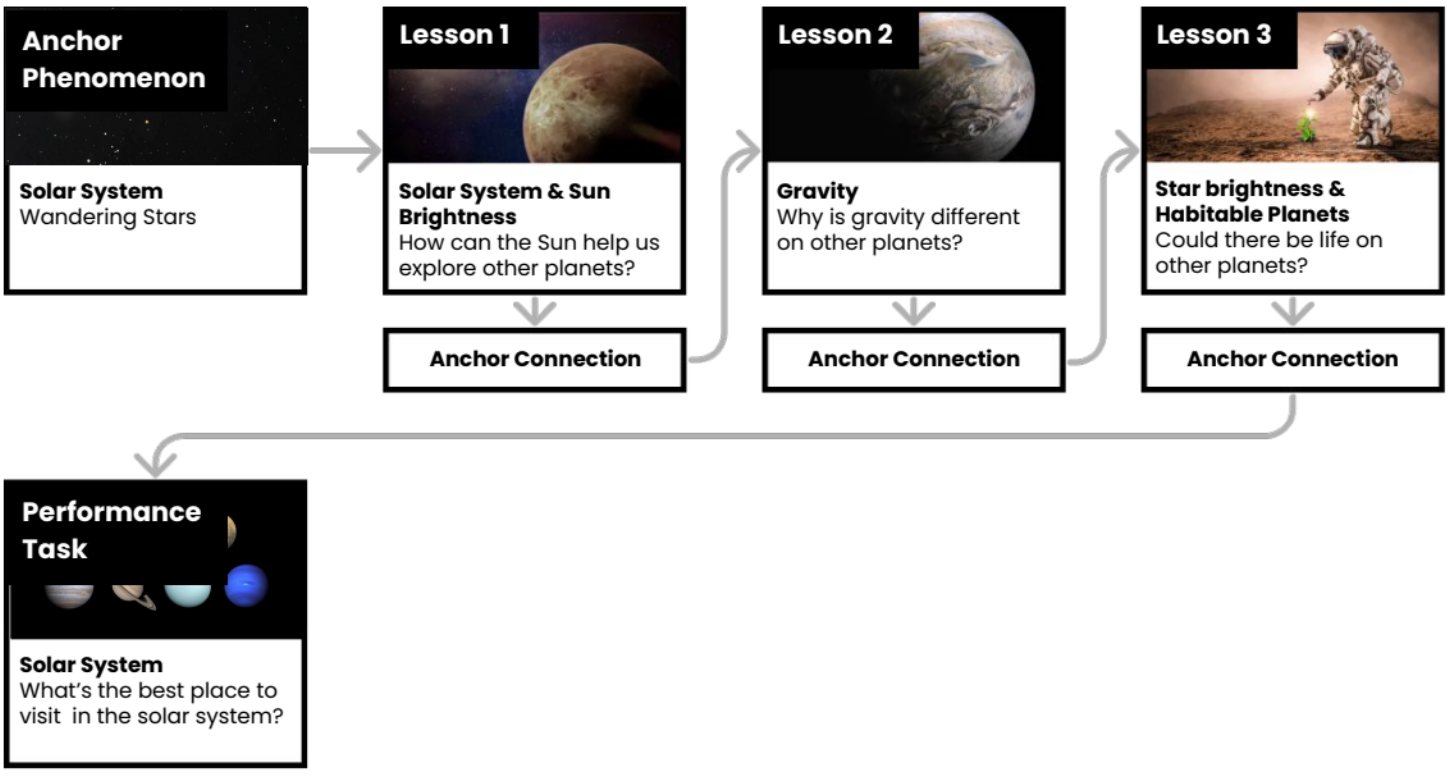


Stars & Planets • Unit Summary

See Teacher Guide

In this unit, students explore our solar system! They investigate how bright the Sun appears from each planet in our solar system and from stars of other solar systems in galaxies far away. They also investigate gravity on Earth and gravity on other planets to discover patterns of this incredible force.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 5-ESS1-1. Support an argument that differences in the apparent brightness of the Sun compared to other stars is due to their relative distances from Earth. • 5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. • 5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.	• Developing and Using Models • Engaging in Argument from Evidence • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Using Mathematics and Computational Thinking • Obtaining, Evaluating, and Communicating Information	• ESS1.A: The Universe and its Stars • ESS1.B: Earth and the Solar System • PS2.B: Types of Interactions	• Cause and Effect • Patterns • Scale, Proportion, and Quantity • Systems and System Models



Unit Summary

See Anchor Layer Teacher Guide

In this unit, students investigate the properties of matter by dissolving everyday chemicals to make solutions and by exploring simple yet surprising chemical reactions. Through these investigations, students begin to build conceptual models for the particulate nature of matter.

Performance Expectations	Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. • 5-PS1-3. Make observations and measurements to identify materials based on their properties. • 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	• Planning and Carrying Out Investigations • Constructing Explanations and Designing Solutions • Using Mathematics and Computational Thinking • Analyzing and Interpreting Data • Developing and Using Models	• PS1.A: Structure and Properties of Matter • PS1.B: Chemical Reactions	• Cause and Effect • Scale, Proportion, and Quantity • Energy and Matter

